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in LONDON;

AND TO THE

CENSORS and FELLOWS

Of the ſame.

GENTLEMEN,

AS the Deſign of the laborious Taſk I have undertaken is calculated intirely for the Improvement and Inſtruction of *young Practitioners* in Phyſic; and as the Office of a *Phyſician* is of the higheſt Concern, I have uſed all imaginable Precaution in laying down a *Set of Rules* whereby *young Beginners* may ſteer their Courſe with Safety to their Patients, and Honour to themſelves. But leſt I ſhould be prejudiced in Favour of my own Performance, and entertain Notions which it little deſerves; I, with all Humility, beg Leave to make my Appeal to you, who are univerſally and undeniably acknowledged the moſt competent Judges.

The generous Incouragement You give to all who endeavour to promote *natural Knowledge*, is well known; and this prudent Conduct of your's hath done much Honour to the *Profeſſion*, and Good to *Mankind*. Many uſeful Diſcoveries have certainly been loſt for Fear of Cenſure; but ſince, *Gentlemen*, You have taken upon you to patronize that which is juſt, and to defend all laudable Inquiries from the Rage and Inſult of thoſe who are too lazy to make Experiments, and too proud to admit of any one's knowing more than themſelves; we hope to ſee *Nature* more cloſely purſued, by a continued Series of accurate, and well-grounded Experiments; from whence only we may expect a *ſolid Theory*, and a *ſucceſsful Method of Practice*.

The *Plan* I have here laid down is very extenſive: *Firſt*, I propoſe to *critically* examine into the State of the *Fluids*, by *analyſing* the *Blood* in every Diſeaſe, where Blood can be drawn with Safety; in order to diſcover the different Quantities of the ſeveral Principles thereof; which, we hope, may be uſeful as well as curious: For, to know the ſeveral Proportions which the *Lymph*, *volatile Salt*,

Salt, *Oil*, *Air*, *Earth*, and *fixed Salt*, bear to each other in a healthy State of the Blood, and the different Degrees of Variation from this *Standard*, in this or that Diſeaſe, or when ſuch and ſuch *Phænomena* appear, muſt needs direct us, in a great Meaſure, to the *true curative Indications.*

As to the *Qualities* of the conſtituent Parts of the Blood, after they have paſſed the Fire, we are ſenſible they are much commuted or altered, and rendered extremely *alkaline*, which Property is not actually to be found in them before Diſtillation, even in the moſt *ardent Fevers*; as I am convinced by innumerable Experiments. And, therefore, all we can infer from hence, is, that ſince all Degrees of Heat tend towards corrupting the animal Juices, and rendering them *alkaline*; ſo in *ardent*

Fevers, the continual, exceſſive Heat of the Body, muſt neceſſarily alter the Humours to an *alkaleſcent* State, though this Quality may never arrive to ſuch a Degree as to ferment with *Oil of Vitriol*, to make a white Precipitate with a *Solution of Sublimate*, or to turn *Syrup of Violets* green.

Secondly, I propoſe to analyſe the *Urine* after the ſame Manner with the Blood; whereby we ſhall ſee how variouſly it is impregnated with *ſaline* and *ſulphureous* Particles in different Diſeaſes, and in different Stages of the ſame Diſeaſe; and alſo be able to account for the great Advantages or Diſadvantages which ariſe when the Urine is thick and turbid, or when it is thin, pellucid, and clear.

Thirdly, I propoſe to *ſtatically* examine the ſeveral Proportions of *Serum*

Serum and *Craſſamentum* which the Blood, in every Diſtemper, divides into, after ſtanding *twenty-four* Hours in a cool Place for that Purpoſe. So that by a long Series of ſuch Obſervations, I doubt not but we may arrive at a perfect Knowledge of the ſeveral Degrees of Thickneſs or Thinneſs of the Blood in each Diſeaſe.

Fourthly, I have invented an Inſtrument whereby I can exactly diſcover the ſeveral Degrees of the *Vis Cohæſionis* between the Globules of Blood, when cold and united into *Gore*. Hence, I am in Hopes, that inveſtigating the different Powers of Attraction or Coheſion between the Globules of Blood, or the various Degrees of Viſcidity or Glutinouſneſs of the Blood in each Diſeaſe, will further illuſtrate the curative Indications.

Fifthly, I have taken eſpecial Care in ſearching after the *antecedent Cauſes* of Diſeaſes, and in ſhewing by what *Laws* they produce ſuch and ſuch *Phænomena*, or by what Means ſuch and ſuch Diſtempers are generated.

Sixthly, From the Whole I have deduced *rational Methods of curing Diſeaſes*, not only from my own Experiments and Obſervations; but I have had Recourſe to the moſt *approved Writers*, and have freely taken from them what I found agreeable to Truth, and my preſent Deſign.

The few Sheets I now lay before you, *Gentlemen*, are but a Part of what I intend, if, by this *Specimen*, you ſhall judge what I have written to be reaſonable, uſeful, and inſtructive. I am already furniſhed with a large Stock of Experiments, and Obſervations on other Diſeaſes, eſpecially of the *inflammatory* Kind; and hope, in Time, to deduce many uſeful and practical Inferences from them.

All that I can plead in Behalf of this Treatiſe is, that the *Experiments* were made with the utmoſt Accuracy, and all the *Phænomena* are related exactly as they happened; that the *Theory* is deduced as much as poſſible from Experiments and known Truths, avoiding all precarious, ungrounded, and merely notional *Hypotheſes*; and that the *Practice* is intirely founded upon, and agreeable to, a continued Series of diligent Obſervations and Experience.

I am ſenſible, however, of many Defects in the following Work, and that ſome will diſapprove of it becauſe there are many Things contained here, which may be ſound in other Books; but if I have collected the ſcattered Notions of the moſt *approved Authors* into one View, whereby they become more uſeful; if I have added to, or improved, what has been ſaid before, ſo as to render the *Theory* and *Practice* of *Phyſic* more conſpicuous and eaſy; and if, *Gentlemen*, I am ſo happy as to obtain your Approbation, I ſhall not, in the leaſt, regard the Cavils of ſupercilious and pretending Critics.

I am,

Gentlemen,

With all due Reſpect,

Your moſt Obedient, and

Moſt Humble Servant,

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PREFACE.

WHOEVER aſpires to an Intimacy with Nature, *is obliged to an unwearied Attendance upon all her Steps and Motions; he muſt diligently watch and obſerve each* Phænomenon *till he has gathered together a large Collection; and then, by comparing one with another, ſuch Inferences may be deduced, as will give ſome Inſight into the* Laws *of their Motions, their* Natures, *and their* Cauſes: *For, if the Things obſerved be true, the Inferences that are drawn may be as certain.*

By theſe Means we may gain a Proſpect of the Out-Skirts *or* Rough-Lines *of* Nature, *which, perhaps, are the fartheſt the unaſſiſted Senſes are capable of arriving at: But if to* *theſe uſeful Obſervations we add a Number of careful and accurate Experiments, they may let us into the particular Laws of Bodies, and the ſecret Operations of Nature; whereby we may be enabled to judge rightly, and to proceed upon ſure Principles. The particular Properties of Bodies are not to be inveſtigated merely by Reaſoning, without diligent Experiment and Obſervation; and ſurely nothing can be more commendable than to ſearch into, and endeavour to explore, as far as in us lies, the ſecret Springs by which all Bodies are ſet in Motion, continued, and regulated: And though it may not be poſſible for us to find out the true ultimate Cauſes of Things, yet, if our Obſervations are faithfully tranſmitted from one to another, and, without Intermiſſion, continued for a long Time, it is inconceivable what Benefits may accrue from every one's improving upon the Obſervations of his Predeceſſor.*

When I reflect on the Nobleneſs, Dignity, *and* Uſefulneſs *of the* Art of Phyſic, *I am highly delighted with the Advances that are daily made towards inveſtigating the true*

Cauſes of Diſeaſes, *and the* Method of Cure. *That the* modern Phyſicians *are happily arrived at ſome Certainty in their Practice; and are infinitely better verſed in all the* Laws *and* Motions *of the* animal Oeconomy, *than what the* Ancients *could pretend to, is evident and obvious to all ſuch who have been in the leaſt converſant with* medical Writers.

The Light that is daily derived from Anatomy, natural *and* experimental Philoſophy, Chemiſtry, Botany, *and* Pharmacy, *is ſo very advantageous and conſpicuous, that, I think, I cannot do better, by Way of Preface, than exhort and adviſe all* young Beginners, *more particularly* Apothecaries *in the* Country, *who are obliged to preſcribe Medicines by Reaſon of the Abſence, or great Diſtance of* Phyſicians, *to a diligent and induſtrious Purſuit of theſe Studies; for (according to the learned* Helvetius*) *he who undertakes the Profeſſion of any Art, without a thorough Knowledge of it's* Rules *and* Principles, *muſt expoſe himſelf to all the Diſgrace that is due*

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* Vide Preface to an *Eſſay on the Animal Oeconomy.*

to the Commiſſion of Faults equally groſs and numerous. And he who neglects to beſtow a cloſe Attention upon the Experiments which his Practice may furniſh him with, renounces the moſt natural Way of Improvement *in his Art, and even runs the Hazard of deviating, in Time, from the* Rules *themſelves.*

Firſt, *then, the beſt and ſureſt Foundation for a true Knowledge of the* Art of Phyſic *is to be laid with an accurate Examination into the Structure, Make, and Conſtitution of the human Body (that* divine *Piece of* Mechaniſm! *the moſt finiſhed* Fabric *upon Earth!) and to find out by what particular Springs and Movements each Part is ſet to Work, continued, and regulated.*

Phyſic *being now-a-days reduced to Mechaniſm, nothing is ſo much talked of as the* Automaton, *or Machine of the Body; and did not Cuſtom or Senſuality ſtupefy us* *, *it muſt be afflicting to a rational Mind, not to underſtand the Structure and Contrivance of the Body wherein it reſides, and by Means where-*

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* Vide *Boyle* on the *Uſefulneſs of Philoſophy.*

of it acquires all the Knowledge it has. The Study of Anatomy is ſo very eſſential towards a right Knowledge of Diſeaſes, that no one ought to undertake the Cure of a Body, the Structure and Make of which he does not exactly underſtand; that is, he ought not to endeavour to rectify a Machine till he is previouſly acquainted with it's Nature.

We are told by the famous Steno *, *that there are but two Ways of coming at the Knowledge of a Machine, either to be taught the whole Contrivance by the* Maker, *or to take it quite to Pieces, and examine each Piece by itſelf, as it ſtands in Relation to the reſt. Since, therefore, the firſt of theſe is not to be expected, we muſt diligently purſue the other Method, by going through proper Courſes of Anatomy, till we are well verſed in the Structure and Diſpoſition of the minuteſt Parts.*

The Knowledge of Oſteology *and* Myology, *is ſoon acquired by the Inſpection of human Bodies; as alſo the greater Organs which Nature uſes in performing her Buſineſs, appear*

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* Vide his *Diſſertation on the Anatomy of the Brain.*

to the naked Eye; but what we moſt want to know is, the true Structure of the Glands, *and the* Modus *of Secretion in the ſeveral Sorts of Glands. Here we have an ample Field for the Induſtry of the preſent and future Ages; here we have Room to make Variety of Experiments, in order to trace the Continuation of the Arteries till they come to ſecretory and excretory Veſſels; whereby we may reaſonably hope to have our Reſearches rewarded with ſuch important Diſcoveries, as would let a vaſt Deal of Light into the Cauſes and Cures of Diſeaſes. Though the Affair of Secretion may be, as yet, very abſtruſe, and the glandular Texture may be thought much too delicate and fine ever to be diſcovered by our finite Intellect, by the moſt piercing Sight, or by the beſt of Microſcopes; yet it is a Thing the moſt worthy of our Examination, ſince the Glands have much the greateſt Share in the animal Oeconomy, and are the Seat of moſt Diſtempers. We are not to be diſcouraged becauſe, at preſent, we know but little more of the Glands than their Surfaces; a large Se-*

ries of accurate and well grounded Experiments may diſcover their conſtituent Frame, at leaſt of ſome of them; and, as every the ſmalleſt Part of this wonderful Fabric is wrought in the moſt curious and beautiful Manner, conſequently every new Diſcovery in it, muſt be highly delightful and pleaſing, as it gives us plain Signatures of the wonderful Hand of the Divine Architect.

Let us, therefore, proceed on, and adventure to ſeek after the hidden Treaſure, to diſcover Nature's *Myſteries, and to ſettle our Judgments upon the beſt and ſureſt Principles, without regarding the Diſcouragements and Prohibitions of ſome of our Predeceſſors; who, becauſe they took Things and Notions upon Truſt, without being at the Pains of making Experiments, would fain perſuade us we are arrived at our* Ne plus ultra, *or that no more Diſcoveries remain to be made. We are all, indeed, too apt to make haſty and erroneous Concluſions; but in Subjects of this Nature, we ought never to ſtint our Reſearches; we ſhould purſue our Inquiries with* *the greateſt Diligence and Alacrity, not doubting, as far as the* Great Author of Nature *allows, of inlarging our Underſtandings.*

Poſſunt quia poſſe videntur, *was the Opinion of* Virgil. *And I am perſuaded many noble Hints have been dropped, and loſt, for Want of Courage to purſue them, or to make proper Experiments in order to illuſtrate them. That which appears extremely difficult, or unſuitable to human Abilities, at firſt Sight, may, by a cloſer Attention, and an orderly Courſe of Experiments, be rendered very conſpicuous; and ſince Health is of an ineſtimable Value, and by all wiſe Men preferred to every Thing, ſo every new Diſcovery in the* medical Art *tranſcendantly ſurpaſſes all other Inventions.*

The Glands *are well known to be no more than ſo many Branches of* Arteries, Veins, Nerves, *and* Lymphatics, *convolved together, and covered by a common Membrane. But the Manner of the ſeveral Convolutions, the various Angles which the decreaſing Series of Veſſels make, before they come to the ſecerning* Tubuli; *and the ſeveral Separations that are made*

made from the Blood, in order to prepare for the Secretion of particular Fluids, are, in a great Meaſure, reſerved as Secrets for future Induſtry to diſcover.

By nice Injections we have already found out an infinite Number of Ramifications, and ſuch exquiſitely fine Tubes, as muſt needs ſurpaſs all Imagination in thoſe unacquainted with Experiments of this Kind. We have diſcovered Arteries as ſmall as $\frac{1}{3240}$*th Part of an Inch; that is, ſo fine, that only ſingle Blood-Globules can paſs them into the Veins: and among all the Promoters of this Art, the accurate and ingenious Dr.* Hales * *ſeems to have advanced it to the greateſt Degree of Perfection; and I doubt not but vaſt Advantages will, hereafter, accrue from theſe or ſuch-like Experiments, ſince it is the moſt extenſive Part of Anatomy that remains to be derived from a cloſe Inſpection of the minuteſt* Tubuli.

All the Inſight we have of Nature, *is intirely experimental, and all the Advances*

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* Vide *Statical Eſſays*, Vol. II.

which ever will be made, muſt be by the ſame Means. It behoves every one, therefore, to make the beſt Reſearches he can into the Nature of our Bodies, in which there are ſuch innumerable Beauties to be diſcovered; and could we but inveſtigate how the largeſt of the Glands *are platted, and wove together, and the* Laws of Secretion *obſerved in them, many uſeful Things might be deduced, to enrich or illuſtrate the Practice of Phyſic.*

The Inteſtines *are really a Gland*, and the moſt viſible one in the Body; whoſe ſecretory Veſſels are the* Lacteals, *and whoſe common* Conſervatory *or* Pelvis, *is the* Receptaculum Chyli. *Here the Complications and Circumvolutions of the Tube are viſible and beautiful; and the* Modus *of Secretion is apparent enough. The* Teſticles *alſo, eſpecially of a* Rat, *are capable of being unravelled, and from the infinite Number of Plications, or Circumvolutions of the ſanguine and lymphatic Arteries, before they come to the ſecerning Ducts, we learn, in a great Meaſure, the*

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* Vide *Cheyne's New Theory of Fevers.*

Manner of Secretion in theſe Glands. And if ingenious and induſtrious Experimenters *could poſſibly find out Ways and Means of evolving or unfolding other Glands, which are more cloſely connected than the* Inteſtines *or* Teſticles, *and alſo of diſtending or inlarging the minute Veſſels of ſuch Glands, which, at preſent, are not conſpicuous; I need not ſay how advantageous ſuch Diſcoveries would be.*

Another Thing that would contribute vaſtly to the Art of Healing, *is* diſſecting morbid dead Bodies. *If this was more cuſtomary among us, we ſhould doubtleſs, in Time, inveſtigate the true* Seats *and* Cauſes *of Diſeaſes, as well as the* Nature *of the* peccant Matter *which proved deſtructive: For by diligently obſerving the Marks and Impreſſions of Diſeaſes in different Bodies, the Alterations in the Humours, and in what Cavities or Organs they principally lodge, we ſhould be able to ſolve the various* Phænomena *upon the beſt Principles, and to eſtabliſh a juſt* Methodus Medendi. *I cannot, therefore, but wiſh, that many of our*

Phyſicians would take more Pains than they do, to advance and encourage a Practice which would ſo greatly conduce to improve the curative *Part of Phyſic: For ſince* Phyſic *owes it's Origin to Experience, ſo it's Improvements muſt ariſe from new Diſcoveries made, either in Art or Nature.*

The Advantages that have accrued from comparative Anatomy *are alſo well known to be extremely uſeful. The* lacteal *and* lymphatic *Veſſels came firſt to be diſcovered by diſſecting* Brutes *alive. The Doctrine of the Circulation of the Blood was greatly confirmed and illuſtrated by the ſame Means; and many other uſeful Diſcoveries are daily made, becauſe here many minute* Tubuli *and Paſſages are open; and appear to the Eye, which are cloſed and concealed in dead Bodies. Add to this, that we may boldly make ſuch Experiments upon Brutes which we dare not venture upon in the Bodies of Men. Beſides, generally ſpeaking, the Parts of Brutes are ſo like the correſponding Parts in Men; that by comparing* *one with another, they ſerve to illuſtrate each other, and to ſhew their Uſes.*

Thus the Knowlege of Anatomy is not only a delightful Study, as it unveils to us the ſecret Springs of the moſt ſtupendous Machine of the Univerſe; but it is highly uſeful, as it extends itſelf to the whole Compaſs of Phyſic; without which it is either nothing at all, or empirical. * *For the Opinion of the* Practitioner *perpetually fluctuates, unleſs he perfectly underſtands the Principles of his Art: And if by Chance any ſuch ſhould ſucceed happily, he would merit no other Commendation, than that he placed his whole Confidence upon Fortune. But, on the contrary, He who thoroughly underſtands the* animal Oeconomy, *will, at all Times, be able to reduce it's* Rules *to Practice, and to apply them, with the greateſt Certainty, to the* Cure *of Diſtempers.*

Secondly, Natural *and* experimental Philoſophy *have, without Doubt, enriched the* modern Theory *and* Practice of Phyſic *with a vaſt Stock of Certainty; and therefore who-*

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* Vide *Friend's Comment. on Fevers.*

*ever deſigns to do Mankind Service by practiſing of Phyſic**, *muſt, firſt of all, make himſelf Maſter of the* Laws of Nature, *he muſt conſtantly meditate and make accurate Obſervations upon them, and obey them to a Tittle; for it is intirely owing to the noble Diſcoveries which have lately been made, by experimental Philoſophy, that the* modern Theory of Phyſic *is ſo vaſtly preferable, and ſhines out ſo bright in Compariſon to the ancient Ignorance; and I am verily perſuaded, had the* Laws of Nature *been as well underſtood in the Age of* Hippocrates, *as they are now, and had proper Experiments and Obſervations been conſtantly made from that Time to this, ſuch Inferences would have been drawn, as to have reduced the Practice of Phyſic very near to a Certainty: By a long continued Series of Experiments, and accurate Obſervations, we ſhould not only have been exactly verſed in the Cauſes of the various* Phænomena *of Diſeaſes, but, in all Probability, we ſhould have*

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* Vide *Baglivi*'s *Practiſe of Phyſic.*

diſcovered, before now, ſpecific *Remedies for each Diſeaſe.*

Ubi Philoſophus deſinit, incipit Medicus, *is a Maxim univerſally received, by Reaſon of the great Uſefulneſs of Philoſophical Inquiries towards inveſtigating and illuſtrating the Laws of the Animal Oeconomy, and the Cauſes of Diſeaſes.* * *If a Phyſician knows not how Heat and Cold, Fluidity and Firmneſs, Fermentation, Putrefaction, Viſcoſity, Coagulation, Diſſolution,* &c. *are generated and deſtroyed in animal Bodies, he will be at a great loſs when he comes to find out the Cauſes of Diſeaſes; for many of them intirely depend upon the Preſence or Abſence, or Change of theſe or the like Qualities. On the contrary, it is a fine Advantage to have learned by a Variety of Experiments, the different Ways whereby Nature ſometimes produces the ſame Effects; for ſeveral Solutions of the ſame Appearances may hence ariſe, which otherwiſe might never have been dreamed of. He therefore, who is only acquainted with a few of*

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* Vide *Boyle on the Uſefulneſs of Philoſophy.*

Nature's Ways of Proceedure, is unlikely to know how Abundance of Diſeaſes are produced; and conſequently, will ſometimes miſtake the Cauſe, and apply Remedies accordingly, when the poor Patient, perhaps, muſt dearly pay for his Phyſician's Ignorance.

Mechanics *and* Hydraulics *muſt be well underſtood, before we can aſſign the Reaſon of the* Phænomena *of Diſeaſes, and account for the apparent Motions of Nature. Every Alteration or Change which is made in the Body, either in Regard to the Texture of the Solids, or Conſiſtence of the Fluids, is the Effect of Motion: For who can conceive a Thing changed, without a Motion made either in the Parts, or the Whole? Motion, therefore, being the Means whereby all the Operations in an animal Body are performed, it behoves every* Practitioner *in Phyſic to make himſelf Maſter of the* Doctrine of Motion, *i. e.* Mechanics.

To ſhew the Structure of Animals, or the Motion of the Muſcles, and to calculate the Weight that is equivalent to the Force they exert, are Taſks that require Mathematical

Knowledge. *All the Fluids likewiſe are ſubject to the* Laws of Hydroſtatics. *The Difference there is in the Streams and Velocity of the Blood depending upon the different Courſes it ſteers, and the different Capacity of the Veſſels that contain it; the arterial Blood running through Canals that are large at the Beginning, and are always growing leſs and leſs; the Venal, on the contrary, running from very ſmall Veſſels into large ones, that are continually widening: All theſe, and many other Curioſities occurring in the animal Oeconomy, are demonſtrable by the Help of* Mathematics *and* Hydraulics, *and cannot be explained, or exactly known, without them.*

Nothing is more apparent than that the Solids of our Bodies are formed by their Maker *according to the ſtricteſt* Laws of Geometry; *and ſince all the Fluids are well known to move by* Hydraulic *and* Hydroſtatical Laws, *certainly the liklieſt Means of inveſtigating the Nature of their Motions, is by adapting our Experiments to thoſe Laws; as manifeſtly appears from what* Borellus *hath taught us* *in his moſt admirable* Treatiſe of the Motion of Animals. *And again, ſince the human Body is nothing elſe but a fine Contexture of Solids and Fluids, which obſerve the Rules of Mechaniſm, it is amazing to find that Men ſhould think of finding any other Principles than the* Mechanical *to explain it by. Certainly we ſhould endeavour to ſolve and explain all the* Phænomena *of Nature, all Animal Oeconomy, Cauſes of Diſeaſes, Reaſons of Cure, and Operations of Medicines by mechanical Modes: Not that it is always in our Power to reduce theſe Rules into Practice, or to account for all the* Phænomena *of Diſeaſes, from* mechanic Laws; *but, however, it behoves us to ſearch into them as much as poſſible, and to explain, by their Aſſiſtance, the Nature of the* antecedent Cauſes *of Diſeaſes, and the Manner how they produce ſuch and ſuch* Diſtempers, *with ſuch and ſuch* Symptoms. *By theſe Aſſiſtances the genuine* Method of Cure *will be greatly illuſtrated, though it muſt be confeſſed that Experience only can enable us to foretel the Iſſue of the Diſeaſe, as well*

well as the Effect of the Remedy adminiſtered; and that our beſt Reaſoning upon ſuch Subjects, how mechanical ſoever, is only à poſteriori.

Mathematical Inquiries, *as far as they will enable us to reaſon rightly, or upon certain Principles, concerning the various* Phænomena *of Diſeaſes, and the* Modus *of Operation, whereby the Remedies ſubdue the ſame, are vaſtly uſeful; but in many Caſes, where all is tranſacted by imperceptible Agents, where the true and real Cauſe of the* Phænomena, *as well as the* Modus *of Nature, in preparing and fitting the Matter of the Diſeaſe, to be thrown forth, will ever be hidden from us; we muſt truſt intirely to Obſervation and Experience; ſince no Diſſection nor Mechaniſm will aſſiſt us here, but only a diligent and ſedulous Attendance upon all the Motions of Nature, which, by Degrees, will let us into the Knowledge of the* Phænomena *of Diſeaſes, and their Effects; from whence we are to draw our curative Indications. I am not, therefore, ſo ſtrict an Advocate for* Mechanics, *as to think we ought to make them the*

Rule of our Preſcription any farther than Obſervation in the like Caſes, or a well-grounded Experience will juſtify the ſame: But I ſhall ever be of one Opinion, that it is perfectly neceſſary for Phyſicians *to underſtand* Mathematics *or* Mechanics, *ſo far, at leaſt, as to be able to ſolve ſuch Appearances which happen in the Body, as are explicable by ſuch Laws.*

The learned Boyle *very juſtly imputes many of the Deficiencies in the Reaſoning of Philoſophers, to their having too haſtily, and without due Obſervation, or a ſufficient Number of Experiments, preſumed to deliver Axioms, and eſtabliſh Principles. For the Theories that are built but upon a few obvious Experiments, are very liable to be overthrown by a fuller Inquiry into Nature. And truely if Men were willing to regard the Advancement of Philoſophy, more than their own Reputations, it were eaſy to make them ſenſible, that one of the moſt conſiderable Services they could do the World, is, to ſet themſelves diligently to make Experiments, and collect Obſervations, without attempting to eſtabliſh Theories upon them,*

them, before they have taken Notice of all the Phænomena *that are to be ſolved: For to regard only a few* Phænomena, *and to pronounce according to them, is the* Bane *of Philoſophy.*

Hence it is that Mechanics *have fallen into Diſrepute among ſome learned Men, becauſe ſome Concluſions, too haſtily drawn from thence, would not ſtand the Teſt of ſtrict Obſervation and Experience. But as this is to be imputed to the Eagerneſs, or Want of Skill in it's* Profeſſors, *and not to the Science itſelf, the Objection is of no Force; neither will it, I am perſuaded, deter any ſenſible Perſon from purſuing theſe Studies.*

The true Method, therefore, of Inveſtigation, *is to confirm each Experiment by repeated Trials, and then we may ſafely proceed to* Axioms, *which may again point out new Experiments; for in the Interpretation of Nature, the Tranſitions of Experiments into Axioms, and of Axioms into Experiments, is natural and eaſy.*

Thirdly, Chemiſtry *is highly advantageous both to the* Theory *and* Practice *of Phyſic; by*

Reaſon it not only affords and inſtructs us how to make many noble Medicines, but alſo lets in a vaſt deal of Light towards inveſtigating the Cauſes *and* Natures *of Diſeaſes.*

Hence we are inſtructed that both the Solids *and* Fluids *of a human Body conſiſt of* watery, ſaline, ſulphureous, aërial, *and* earthy Particles; *that the Coheſion of theſe Particles, whether they conſtitute ſolid, or fluid Parts, depends upon a certain attractive Power; that different Degrees of Motion or Heat will alter the Bulk, Figuration, or Arrangement of the component Particles of the Body; and conſequently, when they are extreme, they will cauſe great Changes, and produce ſurpriſing Effects.*

Hence alſo we learn how ſmooth, mild, demulcent Liquors may gain ſharp, rancid, cauſtic Qualities, & è contra; *what Effects muſt enſue upon a Stagnation of the Fluids in any Part of an animal Body, and what will be the Conſequence of a ſtrong Circulation of the Blood, a violent inteſtine Motion of* **it's** *Parts, and a burning Heat of the Body. For ſince*

ſince the Blood does not act ſolely as a Fluid flowing along it's Canals, according to the Laws of Hydraulics; *but, at the ſame Time, exerts a Force of it's own, according as it is more or leſs impregnated with* Salts, Spirits, Oils, *&c. it evidently appears that he who rightly underſtands the Nature of* Salts, Spirits, Oils, *&c. is infinitely better qualified to regulate any Diſorders in the animal Oeconomy, than one who is ignorant herein.*

Chemiſtry, *according to the ſagacious Lord* Bacon, *ſhews us* Philoſophy *in Action. And according to the learned* Boerhaave, ſpeculative Philoſophy *is made* practical *by* Chemiſtry; *which at the ſame Time that it explains Things, actually exhibits them to the Eye. Here we are daily delighted with the different Views of* Rarifactions, Fermentations, Diſſolutions, Concretions, Sublimations, Precipitations, Cryſtallizations, *and many other* Phænomena *that daily occur in the* Laboratory. *Many* Proceſſes *in Chemiſtry afford us great Light towards inveſtigating the Nature of* Digeſtion, Sanguification, Nutrition. *Here alſo we ſee the natural Cauſes of* Earthquakes, Thunder and Lightening, Snow, Hail, Heat, Cold, *&c. Hence* Boerhaave * *complains of* Lemery's *Method of Chemiſtry, becauſe a great Number of his Proceſſes are calculated merely for the preparing of Medicines; and his View throughout the whole, is rather to furniſh the Shops with Remedies, than to inſtruct his Readers in the Knowledge of Chemiſtry.* But how hard and unjuſt, ſays he, is this on poor Chemiſtry! To make an Art a Drudge to Phyſic, which, in Reality, is the principal Part of all Philoſophy.

Fourthly, Botany *is a very uſeful and delightful Study; the infinite Number of different Sorts of Plants we meet with in every Country, makes the ſearching after them extremely pleaſant; and there is nothing more likely to conduce to the Improvement of the* Healing Art, *than* Phyſicians *applying themſelves to make Diſcoveries of new Remedies. But here I muſt beg Leave to obſerve, that the*

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* Vide *Preface to his Chemiſtry.*

barely knowing the Facies externa *of Plants, the ranging them in regular Claſſes, and giving them proper Names, is but of little Service, unleſs we know their medicinal Virtues, and what Effects they will produce; which it is impoſſible to do, without a ſollicitous and experimental Scrutiny into their Actions on Animal Bodies.*

Phyſic, *without Doubt, took it's Riſe from a Number of Experiments made with* Plants, *&c. without any Certainty* à priori *of what Effects they would produce; and by diligently collecting and comparing the various Succeſſes of ſuch Experiments, the Practice of Phyſic began to be an Art.*

In Order, therefore, to inveſtigate the Properties of ſuch Plants *as are not yet uſed in Phyſic, we muſt have Recourſe to proper Experiments with them; and firſt of all upon* Brutes, *for Fear they ſhould prove deleterious, though their* Taſte, Smell, *or* Figure *give us no Reaſon to ſuſpect ſuch Things: An eminent Inſtance of which, we have lately met with in the* Lauro-Ceraſus. *We have many un-*

promiſing Plants worthy our Conſideration, and might be of ſingular Advantage in the Practice of Phyſic, were their Virtues and proper Doſes thoroughly known. For my Part, I ſhall always be of Opinion, that had half the Coſt and Pains been beſtowed upon a continued Series of Experiments with the known Plants, in Order to diſcover their medicinal Properties, and Effects on animal Bodies, as hath been to find out new ones, more profitable Diſcoveries would have accrued.

Fifthly, Pharmacy *is what every Phyſician ought to be exceedingly well verſed in; for he who does not rightly underſtand the Goodneſs, and ſeveral Qualities of Medicines, and the juſt Proportion of their Doſes, can never be able to apply them ſucceſsfully. But this is ſo well known, and evident, that it would be needleſs to expatiate upon it: I ſhall, therefore, conclude this Head, with adviſing the* young Student, *after he has made himſelf Maſter of* Anatomy, natural and experimental Philoſophy, Chemiſtry, Botany, and Pharmacy, *to apply himſelf to the beſt* practical Authors:

to viſit the Sick *aſſiduouſly, and to make conſtant and accurate Obſervations on the* Phænomena *of Diſeaſes. By theſe Means he will, in Time, get an exact Hiſtory of Diſeaſes, with a true Liſt of the Symptoms that generally attend them; he will ſee by what Means* Nature *gets the better of her Enemy; through what Outlets ſhe commonly expels the morbific Matter; and on what Days ſuch* Criſiſes *happen. By a long Catalogue of ſuch Obſervations as theſe, a Man cannot fail of being a happy and ſucceſsful Practitioner; for when the Nature and Riſe of Diſeaſes are well known, the curative Indications are plain and eaſy.*

Thus by accurately obſerving all the Phænomena *of Diſeaſes, which daily occur to us in Practice, and by comparing them one with another, we may poſſibly find out the true Cauſes of many of them, and afterwards explain them by the* Light of Reaſon, *or by* mechanic Rules. *By the ſame Aſſiſtance we may, in many Caſes, inveſtigate the* Modus *of Nature, in producing as well as carrying off Diſ-*

eaſes. * *The chief Defect in the Practice of Phyſic, does not proceed from the Want of Means to anſwer this or that Intention; but becauſe we do not rightly know what that Intention is, which is to be anſwered: And truly I am very certain, that nothing can ſo much conduce to form the Judgment right in this Matter, as an exact Obſervation of the natural* Phænomena *of Diſeaſes, and likewiſe of the* Juvantia *and* Lædentia; *and if theſe were diligently compared one with another, they would ſhew the Nature of the Complaint, and whence the curative Indications are to be taken: For a Phyſician may as certainly take the curative Indications from the ſmalleſt Circumſtances of the Diſeaſe, as he does the Diagnoſtic from them; and therefore I have often thought, if we had an exact Hiſtory of every Diſeaſe, we ſhould never want a Remedy ſuitable to it; the various* Phænomena *plainly ſhewing the Way we ought to proceed in, and which* Phænomena, *if they were carefully compared one with another, would lead us to*

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* Vide *Sydenham.*

thoſe obvious Indications, which are taken truly from Nature, and not from the Errors of Fancy.

Hippocrates *acquired his vaſt Skill and Character by accurately and diligently obſerving the* Phænomena *of Diſeaſes, and deducing the curative Indications from them. Experience certainly is the beſt Guide; for, as there is much Subtilty in the Operations of Nature, as well as Medicines, he only can be a happy and ſucceſsful Practitioner, who is well acquainted with the natural Hiſtory of Diſeaſes, and has collected a ſufficient Number of Obſervations from the moſt remarkable Incidents, which proceed either from the Nature of the Diſtemper, or the Method of Cure.*

He therefore who intends to ſhine in his Profeſſion, and to be thoroughly verſed in the Knowledge of Diſeaſes, muſt not overlook the meaneſt Thing; he muſt be ſedulous in obſerving and finding out the Seats of Diſtempers, what Alterations happen in the Parts affected, what Symptoms attend upon ſuch and ſuch Diſeaſes, and what their uſual Conſequences are.

Hence he will make himſelf Maſter of the diagnoſtic *and* prognoſtic *Signs, which will enable him to diſtinguiſh one Diſeaſe from another, how like ſoever they may be: And when he has carefully collected a large Series of ſuch Obſervations, he will be able to pronounce his* medical Prediction *from ſound Principles, than which nothing gains a Man more Repute, or diſtinguiſhes a* Phyſician *from a mere* Empiric *more clearly.*

From what has been ſaid it evidently appears, that thoſe who preſume to practice Phyſic *without a plenary Knowledge of it's* Rules and Principles, *run great Riſques, and their Practiſe muſt needs be very precarious, abſurd, and almoſt always contradictory. The Lives of Men are of too great Importance to be intruſted with thoſe who do not underſtand how to preſerve them. Ought not, therefore, ſuch bold* Empirics *who dare to preſcribe Remedies without knowing the Grounds of the Theory of Phyſic and Diſeaſes, to be expoſed and proſecuted for trifling with the Lives of People? I have been informed there are Laws wiſely provided*

vided for this Purpoſe, and great Pity it is they are not put in Execution.

It muſt be confeſſed indeed, the Ancients *were very ſucceſsful, and did many wonderful Cures notwithſtanding their* Ætiology, *ſtrictly taken, was wrong. And ſhould it be aſked, how they cured ſo well with ſo bad a Theory, and with ſuch indifferent Materials as they were poſſeſſed with; I anſwer, it was owing to their reſolute and indefatigable Application, to their Dexterity and Diligence in obſerving the* Phænomena *of Diſeaſes, which, in a great Meaſure, directed them to the Cure. But had they underſtood the Circulation of the Blood, and the Laws of the ſeveral Motions in the animal Oeconomy, and had they been furniſhed with as many uſeful Drugs as we are now-a-days, I am perſuaded their Induſtry would have left but little for the* Moderns *to diſcover, and that they would have delivered down to us a moſt exact natural Hiſtory of Diſeaſes, together with their genuine Method of Cure.*

Proceed we now to give the Reader *a ſhort Account of the following Work. And,*

1. *Since it ought to be the principal Care of every* Phyſician *to trace out the* original Cauſes *of Diſeaſes, I have taken great Pains in remarking the ſeveral moſt uſual* Antecedents *to each Diſtemper, and to illuſtrate and explain them in the moſt familiar Manner whence the* Riſe *of the* Symptoms *may be eaſily accounted for, and the* curative Indications *drawn.*

Phyſicians *too commonly conſider the outward and general Appearances of Diſtempers only, without penetrating into the particular Conſtitution of the* Air, *the Abuſe of the* Non-Naturals, *&c. which occaſioned, and ſuppor them, and that require, on theſe Accounts, different Methods of Cure. Hence it is that great Numbers of Medicines recommended to us in particular Diſeaſes, do not anſwer under different Conſtitutions of the Air, or when the Diſtempers take their Riſe from various Exceſſes, and Irregularities in Life. Our Ignorance of the* antecedent Cauſes *is oftentimes the*

the Occaſion of fatal Errors, and groſs Miſapplication of Medicines; and if ſo, we cannot be too induſtrious in ſearching them out, and accurately examining into their Effects and Influences on the animal Machine.

2. I have been very careful in giving an exact Deſcription of the Phænomena *which characterize each particular Diſeaſe; and to ſhew by what Means, and by what Laws they ariſe from the* Antecedents.

By a diligent and accurate Obſervation of the Symptoms, *we become able to diſtinguiſh and remark their Progreſs, Variations, and ſeveral Accidents that uſually attend them. Hence we are taught, that a Man actually affected with ſuch and ſuch* Symptoms, *has certainly ſuch a* Diſeaſe. *And, indeed, ſince* Nature *ſo often ſhifts from one Appearance to another, it certainly is of the greateſt Uſe to have the* diagnoſtic *or* characteriſtic *Notes of Diſtempers ſet in the cleareſt Light; for it is by theſe the* ſpecific *Differences between Diſeaſes are to be determined, however analogous they may ſeem to a ſuperficial Obſerver.*

3. *Becauſe ſome of the* Phænomena *of Diſeaſes require that we ſhould perfectly know the Conſiſtence of the Blood, before we can rationally account for them, I have employed myſelf, for ſome Years laſt paſt, in* ſtatically *examining the Blood in all the Stages of each Diſeaſe, where* Bleeding *was thought proper; in order to diſcover the ſeveral Degrees of it's Fluidity or Thickneſs, or the ſeveral Proportions of the* Serum *and* Gore, *which it would let go of it's own Accord, after ſtanding* 24 *Hours in a cool Place.*

I have alſo carefully remarked the ſeveral Degrees of Coheſion between the conſtituent Globules of the Craſſamentum; *whence I have had an Opportunity of ſeeing the State of the Blood when almoſt every* Phænomenon *appeared; and from thence I have demonſtrated the Neceſſity of ſuch and ſuch Appearances from the different Conſiſtence and Diſpoſition of the ſanguineous Maſs.*

4. *There are other* Phænomena *that demand our Knowledge of the ſeveral* Principles *or* Qualities *of the Blood, and of their ſeveral*

Proportions, *before we can rightly underſtand their Cauſes. In order, therefore, to know theſe Things, I have ſeparated and divided the Blood into it's primitive and component Parts, by a* chemical Analyſis ; *and have very exactly ſet down the ſeveral Proportions of* Phlegm, volatile Salt, Oil, Air, Earth, and fixed Salt, *wherewith the Blood abounds, not only in Health, but in Diſeaſes.*

5. *As the Inſpection of Urine is oftentimes ſerviceable in judging of the Symptoms, and foretelling the Events, I have taken the Pains to analyſe it in the ſame Manner with the Blood, that we might reaſon from ſelf-evident Principles, and not from precarious and ungrounded* Hypotheſes.

Thus, by obſerving the Quantities and Qualities of the ſeveral Principles of the Blood and Urine in every Diſtemper, I have met with vaſt Advantages towards illuſtrating the Theory of Diſeaſes, *and in eſtabliſhing a ſafe and ſucceſsful* Method of Practice : *For, to know the State of the Fluids, from the Beginning of the Diſtemper to the End of it, is of the utmoſt Importance.*

It is conſonant with the right Method of philoſophiſing *, *firſt to analyſe the Subject, whoſe Nature and Properties we intend to make any Reſearches into, by a regular and numerous Series of Experiments: And then by laying the Event of thoſe Experiments before us in one View, thereby to ſee what Light their united and concurring Evidence will give us. If we reflect on the vaſt Diſcoveries that have been made in the animal Oeconomy, we ſhall find, that the moſt conſiderable of them are owing to* ſtatical *Examinations, and* chemical *Proceſſes. By the former were diſcovered the Quantities and Proportions of the Solids and Fluids in an animal Body; the different Rapidities and Force with which the Fluids are carried about in their proper Channels; the Proportion between the Aliment taken in, and the recrementitious Matter caſt out of the ſeveral Emunctories,* &c. *By the latter, we have received great Light into the Nature of Digeſtion, and Sanguification; the Properties of the ſeveral Fluids; the Manner of their*

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* Vide *Hales's Analyſis of the Air.*

Action on each other; the Nature of Fermentation; the Cauſe of Heat; and many other Things too tedious to enumerate. In ſhort, experimental Philoſophy puts us upon thinking farther and farther, and upon ſearching into the Receſſes and Fineſſes of Nature without End.

The capital Things of Nature generally lie out of the beaten Paths; ſo that he who would make new and uſeful Diſcoveries, muſt take the Pains to walk by himſelf in untrodden Roads. And here let none deſpair, or be confounded (according to the Advice of Lord Bacon[*]*) if the Experiments they attempt ſhould not anſwer their Expectation: For though Succeſs be indeed more pleaſing; yet Failure, frequently, is no leſs informing.*

Hence I was incouraged to purſue theſe Methods of Inquiry, and hope that the Tables *I have given of the* Craſis *of the Blood, and the Proportions of the ſeveral Principles of the Blood and Urine, both in a ſound and diſeaſed State, will be highly uſeful in inveſtigating*

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[*] Vide *De Augm. Scient.* Sect. xii.

the Cauſes of the Phænomena *of Diſeaſes, and the moſt expeditious Way of relieving them.*

6. *The* Method of Cure, *which I have laid down in the following Sheets, is deduced intirely from the* antecedent *Cauſes, and the* Phænomena *that attend upon each Diſeaſe; ſo that nothing can be more rational, intelligible, or plain. It is the Reſult of many Years' Experience, intermixed with the Obſervations and Directions of the moſt* approved Authors; *for I have always made it my Buſineſs, ſince I have been converſant in Practice, to minute down all remarkable Caſes, with their Method of Cure. Hence I have the Satisfaction to think that the following Sheets are pregnant with known Truths, uſeful Obſervations, a juſt Theory, and ſure Directions for Practice; and that they cannot fail of being greatly ſerviceable to* young Practitioners.

7. *I have carefully avoided giving a long Detail of* Preſcriptions; *and have only pointed out a few, plain, ſimple Medicines, which long Experience hath taught us to be moſt uſeful; being well aſſured that* general Forms *ſerve*

chiefly to deceive the unſkilful, by Reaſon they cannot be ſuitable to the various Circumſtances of different Patients: For, as various Cauſes and Phænomena *require different Medicines, therefore no* Specific, *or certain* Formulæ *can be depended upon in any Diſeaſe, but muſt be always carefully varied and ſuited to the particular Diſpoſition of the Humours, and to the Strength of the vaſcular Syſtem. I do not know of any thing which has been more prejudicial to the noble and generous Art of Phyſic, or has more expoſed it to Reproach and Contempt, than crying up of* Specifics, *or giving* pompous *Forms of Medicines with* magnificent *Titles: For, ſince it is abſolutely impoſſible they ſhould anſwer alike in different Conſtitutions, ſo when the Credulous or Ignorant make uſe of them, and are deceived by their own Experience, they are apt to deſpiſe and blame the Art of Phyſic, as deluſory and uncertain, when the Fault was not in the Medicine, but in a wrong Application.*

He therefore, and only He *deſerveth the Name of a good Phyſician, who always deduces* *his curative Indications from the Cauſe of the Diſeaſe, and the Symptoms that attend it. And as the Cauſes of Diſeaſes are more ſimple and plain than they are generally thought to be, ſo it is, moſt Times, an eaſy Matter to cure them by the Uſe of a few, and frequently plain Medicines. Thoſe who preſcribe a Multitude of Things, ſeldom have clear* Ideas *of the* Cauſes *of Diſeaſes; they are diffident and wavering in their Opinion, and for Want of a ſure* Baſis *to found their curative Indications upon, they rely on a* Farrago *of Medicines, in Hopes that ſome of them may be uſeful.*

Laſtly, *I have made a Diſtinction between* ſlow Fevers *and thoſe which are actually* malignant *and* putrid; *becauſe I am well aſſured that there are Fevers which ſtrangely affect the Nerves, and exhibit all the Signs of a depreſſed State of the animal Spirits, without the leaſt Degree of Putridity or Malignity in the Humours; and therefore, for Want of ſuch Diſtinction, fatal Errors are oftentimes committed, as we ſhall ſhew in it's proper Place.*

If it be objected, that many Things mentioned in this Treatiſe, may be found already accounted for, and demonſtrated in the Writings of others; I anſwer, that I am not aſhamed of having ſought Aſſiſtances from the Labours of others: I frankly acknowledge to have tranſcribed many Things; but ſince I have generally pointed out the Place and Perſon, I hope I ſhall not be accounted a Plagiary *for ſo doing. It has coſt me no ſmall Pains to collect the ſcattered Notions of the moſt* approved Authors *into one View; and as I have illuſtrated ſome, and added many uſeful Obſervations to others, ſuch a Work muſt needs be ſerviceable in many Reſpects; ſince it is making ſome Advance in Knowledge, further to illuſtrate even known Truths, or to confirm and explain them in the moſt intelligible and familiar Manner.*

Some of my Readers, *perhaps, may think me too prolix in deſcribing ſome Things, which, to them, may appear minute and trivial; but, as this Work is deſigned merely for the Uſe of* young Practitioners, *I would deſire them to* *conſider that a Deſign of this Nature cannot be too plain: It is oftentimes for Want of Perſpicuity in* Authors *that the* Unexperienced *commit Blunders. My great Endeavour therefore, throughout the Whole, has been, to lay down the moſt exact Rules in Regard to Practice; and though, in Reſpect of ſome Readers, I might have been excuſed the Trouble, yet, I flatter myſelf, there are not a few to whom the following Papers will be ſerviceable and uſeful.*

If any think my Style rough and unpoliſhed, I would have them reflect, that in a Work of this Kind, Elegance of Style is not to be expected. My greateſt Care has been to collect and lay up ſuch Materials for the Work, as are ſound and good; and to deſcribe them cloſely and conciſely, by plain, clear, and ſignificant Expreſſions, rather than ſuch as are ornamental. Rhetorical Flouriſhes ill ſuit, where the Deſign is only to inform; ſo that if what I have wrote be but intelligible, I ſhall be in no Concern for the Roughneſs of the Language.

If I have erred in any material Circumſtance, I ſhall be ready to retract upon the leaſt Notice; but as for trifling Miſtakes, I anſwer, that he who employs his Time in ſearching into the Arcana *of Nature, and is ſo generous as to communicate his Diſcoveries, ought to be eſteemed a Benefactor to Mankind; and though ſome Inaccuracies ſhould happen in his Deſcription of Things, and ſome of his Deductions ſhould not be ſo ſtrong and concluſive as they might have been, yet they ought to be kindly received in regard to the Intention.*

To conclude; I have taken a Deal of Pains in collecting Obſervations for the Hiſtory and Cure of Diſeaſes; I have diligently ſpent my leiſure Hours in accurately examining into the various Phænomena *of Nature; and if what I have written will add, in the leaſt, to the* Advancement of natural Knowledge, *and to the* Cure of Diſeaſes, *I ſhall think my Time well beſtowed, whatever malevolent and ill-natured Men may think fit to ſay of it.*

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THE MODERN Theory *and* Practice OF PHYSIC.

CHAP. I.

Of the Antecedents *to* acute continual Fevers.

1. BEFORE we enter upon the Subject of this Chapter, we beg leave to lay down the following *fundamental Propoſitions*; the Truth whereof is ſo clear and well eſtabliſhed, that they may ſafely paſs for *Axioms*, or known Truths.

PROPOSITION I.

An animal Body is a delicate Machine, or a *Compages* or *Congeries* of vaſcular Tubes differently modified, platted, and woven together; and this *Mechaniſm* is governed and conducted by the ſame *Laws* which ſupport the great *Orbs* of the Univerſe: whence it is impoſſible for any Change, or Variation to be made in it, but from an Alteration of it's Matter and Motion.

PROP. II.

The ſeveral productive Cauſes of Diſeaſes have their peculiar and certain Effects in producing particular *Phænomena* or *diagnoſtic Signs*, according as they alter the Texture, Figuration, or Bulk of the component Parts of the *Fluids*; or according to their Influence over the *Solids*, either by rendering them too tenſe and contracted, or too ſoft, flabby and relaxed.

PROP. III.

Matter, by what Name ſoever dignified or diſtinguiſhed, can have no other Virtues or Properties, than ſuch as reſult from the particular Figures and Modifications of it's conſtituent Particles.

2. From theſe *Propoſitions*, therefore, it appears, that the Method in which we are to proceed, requires us diligently to examine into, and inveſtigate the *prediſpoſing*,

or *procatartic Cauſes* of *acute continual Fevers*; and to ſhew upon what *Principles* they act, and by what *Laws* they influence, the delicate fine *Fibrillæ* of the Body, and their contained Juices.

3. *Firſt* then, *Hippocrates* * aſſures us, that the *Changes* of *Seaſons* are the moſt effectual Cauſes of Diſeaſes. And as daily Experience ſufficiently teaches us the Truth of this, it is evident that there is not any Thing in all Nature of more immediate Concernment to us than the *State of the Air*; there being no Diſtemper but what may derive it's Original from, or owe it's Growth to, ſome Alteration in it's Properties or Qualities, either in reſpect to it's different Degrees of *Denſity* or *Levity*, *Moiſture*, *Dryneſs*, *Heat*, *Cold*, *Motion*, or as it happens to be more or leſs impregnated with *heterogeneous Particles* of one Kind or another. And ſince our Bodies are only *Congeries*, or Bundles of infinitely minute Veſſels, upon which every Alteration of the Atmoſphere has a peculiar Effect, it is extremely requiſite that we ſhould be careful to remark theſe Alterations, and the *Phænomena* they produce.

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* Vide *Aphor*. i. Sect. 3.

4. Almoſt every body knows what vaſt and ſudden Alterations a little Change of Weather makes in a *Barometer*, *Thermometer*, *Hygroſcope*, &c. And we ſhould not fail to obſerve as great and regular Changes in the *Tubes*, *Chords*, and *Fluids* of our own Bodies, were it not partly for our Inattention, and partly for our unequal and intemperate Courſe of Living.

5. The Difference of Air in point of *Gravity*, may have very conſiderable Influence over our Bodies, as is evident from climbing over tall Mountains, and from various Experiments in the *Receiver* of an *Air-Pump*; where it is no uncommon Thing for the Blood to guſh out of the *Noſe*, *Mouth*, &c. by reaſon of the vaſt Expanſion of the Air included in the Veſſels, when the external Preſſure is, in a great meaſure, taken off from the Body.

6. Mr. *Boyle* * diſcovered by very accurate Experiments, that the Air, without any adventitious Heat, would, by the Force of it's own Spring, poſſeſs *thirteen Thouſand Times* the Space it doth when preſſed by the incumbent Atmoſphere. The Difference of the Weight of Air that our Bodies ſuſtain

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* Vide Chap. *of the Rarifaction of the Air.*

tain at one Time more than another, is alſo very great. The whole Weight of Air which preſſes upon our Bodies, when the Mercury is higheſt in the Barometer *, is equal to 39,900 Pounds *Troy*. And the Difference between the greateſt and the leaſt Preſſure of the Air, is equal to 3982 Pounds *Troy*.

7. Hence it is evident, that an Addition of the Atmoſpherical Preſſure muſt have great Influence on Animal Machines; by condenſing the Fluids, and rendering the Blood-Globules more compact, groſs, and viſcid; and by uniting the component Parts of the Solids: Whence the Diameters of the ſeveral Series of Veſſels are leſſened, whilſt the Globules, which conſtitute the Fluids, coaleſce and are inlarged. Add to this, that as the Lungs are more forcibly expanded when the Gravity of the Air is increaſed, and as the Circulation of the Blood meets with moſt Reſiſtance towards the external Superficies of the Body, when the Preſſure of the Air is greateſt; it muſt neceſſarily follow, that the Velocity and Quantity of Blood will be greatly increaſed in the larger Arteries: Whence the Friction and Heat

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* Vide *Wainwright* of the *Non-Naturals*.

of the Blood may be great enough, eſpecially if this State of the Air continues long, to inſpiſſate the Juices, to generate Obſtructions, and to produce *ardent Fevers.*

8. It is obſervable, that *acute Fevers* are moſt rife and violent in *hot dry Summers. Hippocrates,* in his moſt excellent *Books of epidemical Diſeaſes,* takes notice, that an *Exceſs of Drought* produces *continual Fevers,* with *Delirium* and *Thirſt.*

9. *Dry Air,* if it continues too long, may render the Fibres rigid and ſtiff, and the Blood viſcous and denſe, by abſorbing the watery humid Particles from the external Superficies of the Body, and from the internal Superficies of the Lungs, in too great Quantities. Hence the *Areas* of the tranſverſe Sections of the ſeveral Series of Veſſels may be diminiſhed, greater Reſiſtance may be given to the Circulation of the Blood and Lymph (eſpecially in the capillary Tubes) the Pulſe will become quick, ſtrong, and hard, the vital Heat will be increaſed, the Globules of Blood and Lymph will be rendered more groſs and compact, and *ardent Fevers* will unavoidably occur more frequently in ſuch Seaſons.

10. *Moiſt Air* does not ſeem capable of producing *ardent Fevers*, by reaſon of it's relaxing and diluting Property; and therefore we ſhall defer ſpeaking of it, till we come to treat of *Intermittents*.

11. *Hot Air* may be pernicious to the Conſtitution, by thickening and inſpiſſating the animal Fluids, and rendering them impaſſable through their Canals. The Blood of Animals in hot Countries is found to be thicker and blacker, by the diſſipation of the ſerous Part, than in cold Climates. And indeed the Symptoms which we feel in extremely hot Weather, reſemble thoſe of a Fever; *viz. A Pulſe quicker than natural, great Thirſt, Debility, Reſtleſſneſs, and profuſe Sweats.*

12. *Boerhaave* * obſerves, that the Heat of a temperate Air may be reckoned about *forty-eight Degrees*; which being much cooler than the animal Fluids, is very ſerviceable in abating the Heat of the Blood, and preventing a mortal Coagulation. Bu if the Heat of the Air ſhould riſe to *eighty* or *ninety Degrees*, no Perſon could live in it; becauſe ſuch a Degree of Heat would inſpiſ-

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* Vide *New Theory of Chemiſtry.*

ſate or thicken the Fluids in ſuch a manner, as to bring on immediate Death.

13. The natural and healthful Heat of our Blood is reckoned *ninety two Degrees*; and Heat not much exceeding an *hundred Degrees* is found to coagulate the *Serum*, like the White of an Egg: Whenever therefore, the Heat of the Air is much increaſed, it will tend to render the Blood and Lymph thick and grumous.

14. Another pernicious Property of *hot Air* is exalting and volatilizing the *ſaline* and *ſulphureous* Principles of the animal Fluids; whereby they become acrid and corroſive, and ſtimulate the Veſſels into more frequent Contractions. By ſeveral *Chemical Proceſſes* we learn, that a moderate Degree of Heat, no greater than that of a healthy Man, will ſoon render the *Blood*, *Lymph*, *Bile*, *Urine*, &c. highly acrid and alkaline: No wonder then that the exceſſive Heats of a Summer ſhould ſometimes exalt and ſubtilize the Animal *Salts* and *Oils*, and render them much more volatile, active, and powerful than at other Times. Add to this, that in *Summer-Time*, the Air is replete with volatile *Spirits* and *Oils*, raiſed from Animal and Vegetable Subſtances,

which may ſtimulate the Fibres, and exhilarate the Spirits, and thereby contribute towards increaſing the Celerity of the Circulation.

15. It is true, moderate Heat relaxes the Fibres; but when it is violent, and continues long, Experience teſtifies, that it hardens and renders them more rigid and ſtiff; by exhaling their Moiſture, and bringing their conſtituent Particles into cloſer Contacts. Upon the whole it appears, that exceſſive Heat will diſpoſe the Animal Fluids to be viſcid, acrid, and alkaline, and the Veſſels to be ſtiff, elaſtic, and tenſe.

16. *Extreme cold Weather* has very ſenſible Effects on our Bodies, by irritating the Fibres, and condenſing the Fluids. We may plainly perceive the Obſtructions in the *miliary Glands* of the Skin, eſpecially upon the Arms and Thighs, when cold Air has free Acceſs to them; their excretory Ducts being thruſt forward by the Pulſion of the perſpirable Matter, and diſtended in ſuch a Manner, as exactly to repreſent the Skin of a deplumed Fowl.

17. *Sanctorius* aſſures us, *Aphor.* ix. *Sect.* 2. If in a warm Seaſon a cold Day happens, ſuppoſing the way of Living to be the ſame,

about a *third* Part of the perſpirable Matter will be obſtructed. And it is well known, that even a cold Evening ſupervening an exceſſive hot Day, will contract the Pores, and congeal the inſenſible Steams; and the Violence of Diſeaſes ariſing from ſuch Contrarieties of Weather, is always in proportion to the Degree of the former Heat, and ſupervening Cold conjunctly.

18. In all Countries betwixt the *Tropics* *, their continual hot Fevers ariſe from a ſevere cold Wind ſuddenly blowing after exceſſive Gleams of Heat. This is ſo true, that all *Travellers* aſſign this as the Cauſe, having conſtantly obſerved their Fevers to ſucceed ſuch ſudden Changes of the Air. A pregnant Inſtance of which we have in the *Phil. Tranſ.* for *Decemb.* 1669. *N.* 259. in a Letter from Mr. *Hugh Jones* to Dr. *Woodroof*, concerning ſome Obſervables in *Mary-Land*; his Words are theſe: "The "North-Weſt Wind is very ſharp in Win-"ter, and even in the Heat of the Summer "it mightily cools the Air; and too often at "that Time, a ſudden North-Weſt Wind "ſtrikes our Labourers into a Fever, when "they are not careful to provide for it,

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* Vide *Cheyne's New Theory of Fevers.*

" and put on their Garments while they are " at work."

19. *Cold* both congeals the *Fluids*, and conſtringes the *Solids*. It acts like a ſmall Ligature on the Veſſels, by which the Circulation to the external Surface of the Body is retarded, and the Blood driven upon the inward Parts with a greater Force. By many Experiments we are taught that *Cold* condenſes and fixes all Sorts of Matter; the moſt ſolid Things are found ſo much the more firm and contracted, the freer they are from Heat or Fire: So that were a Man intirely deſtitute of Heat, he would immediately freeze into a Statue.

20. Hence it follows, that in cold Weather even the moſt ſolid Parts of our Bodies ſink into leſs Bulk, and their component Particles cohere more ſtrongly: which ſeems to be all that is requiſite to augment their elaſtic Force, and to create a ſtrict Conſtitution of the Fibres: For as the Vicinity of the Particles to one another, gives them new Power; inaſmuch as the Force of Attraction between them, is hereby increaſed; ſo it will require a greater Impulſe to bend ſuch Bodies; and when they are bent, they will fly out again with a greater Velocity.

21. *Cold*, in a moderate Degree, is a Preſervative of human Bodies, by acting in oppoſition to Heat, and maintaining the Ballance: For, as hath been obſerved above, was the Atmoſphere immediately ſurrounding us, in as great Agitation, Motion, and Heat, as the conſtituent Parts of our Bodies, both the *Solids* and *Fluids* would ſoon putrefy, corrupt, and fly off in volatile, alkaline Vapours.

22. The Interchanges, therefore, of *Heat* and *Cold*, between the *Day* and the *Night*, are perfectly neceſſary towards the Preſervation and Oeconomy of animal Bodies; for the conſtant oſcillatory Motions of Contraction and Dilatation produced by theſe Alterations, greatly aſſiſt in carrying on the Circulation, removing Obſtructions, or dilating ſuch Veſſels as were too narrow before. Were it not for this Variation of Day and Night, animal Bodies could never ſubſiſt; the perpetual Preſence of the Sun would be intolerable; it would heat our Atmoſphere to ſuch a Degree, that all animal Subſtances would grow alkaline, corrupt and ſtink. Hence it is that the *Tropical Heat* under the *Pole*, is greater than that under the *Line*, in proportion of 5 to 4; the Duration of

the Sun above the Horizon, the whole 24 Hours, over-balancing the Difference of the Inclination of it's Rays; as the accurate and learned Dr. *Halley* * hath demonſtrated. And, on the other Hand, if there was no Day, or no Sun above the Horizon, the Fluids in our Hemiſphere would ſoon become as rigid and hard as Stones; all Things would fall towards the Centre of the Earth, and remain in eternal Reſt.

23. But, however, hot, ſultry, ſuffocating Weather does not always proceed merely from the Action of the ſolar Rays upon the Particles of the Air, or by being reflected back again from the Earth; for it oftentimes happens from an inteſtine Motion or Effervеſcence between the ſtrongly elaſtic, repulſive, aëreal Particles, and ſome ſtrongly attracting ſulphureous Vapours exhaled from the Earth. The Rev. Dr. *Hales*, in his *Analyſis of the Air*, gives us many Inſtances of the briſk Agitation and Effervеſcence, which ariſes from the Mixture of freſh Air, with Air that is ſtrongly impregnated with ſulphureous Fumes, which are raiſed by Effervеſcence from ſeveral mineral Subſtances; and, ſince we have many Proofs

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* Vide *Phil. Tranſ.*

of the briſk Action and Reaction there is between elaſtic Air and ſulphureous Particles, we may, with the above-mentioned *Author*, reaſonably conclude, that the irkſome Heat which we feel in what is called a cloſe, ſultry Temperature of the Air, is occaſioned by the inteſtine Motion between the Air and the ſulphureous mineral Vapours which are exhaled from the Earth. But to proceed;

24. *High Winds* have their Influence over our Bodies, by bringing a Succeſſion of freſh Air, and by blowing off the Atmoſphere of warm perſpirable Matter that ſurrounds us. Hence a ſtrong Current of Air appears far colder to the Touch, than the ſame Air not formed into a Stream; and for this Reaſon, the *perſpiratory* and *ſudatory* Veſſels may be obſtructed by Winds, without any real Addition of Cold to the Air.

25. The Air may be rendered unwholeſome by mineral, ſulphureous, ſaline Vapours which float in it, and which not only vitiate the Aliments by mixing with them, but they inſinuate themſelves into the *Vaſa inhalantia*, ſituated on the external Superficies of the Body, and through the Pores

of the *pulmonary* Membranes, and paſs on to the Blood through the *recurrent* Veſſels.

26. *Air* *, if we conſider it in general, is an univerſal Aſſemblage or *Chaos* of all Kinds of Bodies, elevated from the Earth, by the celeſtial or ſubterranean Heat. It is a Maſs of Matter which continually ſurrounds our Bodies, in which we live and walk, and which we are continually receiving and caſting out again by Reſpiration. No wonder then, that it is capable of producing ſurpriſing Alterations in the animal Oeconomy, according as it is more or leſs impregnated with mineral, ſulphureous, or ſaline Particles.

27. By the Influence of the Sun, Ferments and inteſtine Motions are perpetually raiſed in the Earth, which emit and diffuſe through the vaſt, ſubtil, fluid Expanſe, either their kindly and grateful, or their malignant, congealing, and putrefying Qualities. For though the Purity of this heterogeneous Fluid in general, is moſt wonderfully preſerved by various Agitations and Motions, ſuch as are produced by Heat, Winds, Fermentation, *&c.* yet it muſt neceſſarily happen, that the Air of particular Regions,

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* Vide *Boerhaave*'s *Chemiſtry.*

Seaſons, and Places, will differ very much in the Proportion to the Mixture of it's Ingredients; and therefore different Air muſt affect human Bodies variouſly, in proportion to the Exceſſes of ſuch and ſuch Principles contained in it.

28. The ſagacious Lord *Bacon* * propoſes an uſeful Experiment in order to try the Wholeſomeneſs or Unwholeſomeneſs of the Air. As Fleſh, ſays he, putrefies ſooner in ſome Cellars than in others, it were uſeful to transfer this Experiment to the Examination of *Airs*, as to their being more or leſs wholeſome to live in; by finding thoſe wherein Fleſh remains longeſt unputrefied: And the ſame Experiment is applicable to diſcover the more wholeſome or peſtilential Seaſons of the Year; for doubtleſs it is to theſe Vapours and Exhalations, that particular Healthfulneſs or Unhealthfulneſs in ſome Places more than others ſhould be aſcribed.

29. The Variety of theſe Vapours is almoſt infinite; and there is ſcarce any Body in Nature that can be excepted from the Number†: For Gold ſticks cloſe to Sulphur

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* Vide *De Augm. Scient.* Sect. xii.

† Vide *Boerhaave ubi ſupra.*

in the Mines, and is raiſed with it. And, with the other Metals, alike inflammable, arſenical Sulphur is found intermixed; which being agitated by Fire, readily carries them off: And the other Foſſils, as Coals, Marcaſites, *&c.* riſe ſtill with more eaſe. So alſo all Sorts of Waters, Spirits, Oils, acids, alkaline, inflammable, compound, *&c.* muſt be ever floating, in Abundance, in the Air; as follows from the continual Diſtillations, *&c.* made thereof. Earths, we add, are many of them eaſily volatilized, and made to float in the Air; for all, even the moſt ſubtile, Oils yield a conſiderable Quantity of Earth at the ſecond Diſtillation; ſo that the Earth muſt float with the Oil. What then can be excepted? Nothing.

30. Now, ſince it is plain from many Experiments, that an animal Body abſorbs or imbibes the Vapours floating in the Air, it is evident that as the Air is more or leſs impregnated with Corpuſcles, or Principles of this or that Sort, or as they happen to coaleſce or unite with other Principles of a different Nature, they may be exalted into dangerous Weapons, and become the Inſtruments of ſundry Diſeaſes. Thus, when the Air is impregnated with

Particles

Particles whoſe Nature it is to ſtimulate and contract the ſeveral Series of Veſſels in an animal Body, and to coagulate the Blood and Lymph, or to compact their component Globules together, ſo as to make them too bulky to paſs freely through the lymphatic or ſanguine capillary Veſſels; the Lungs, Heart, and larger Arteries will be more than ordinarily diſtended with Blood, the Pulſe will become full and ſtrong, the Heat of the Body will be augmented, and *acute continual Fevers* may enſue, as we ſhall demonſtrate hereafter. From what has been ſaid it is plain, that *He* who would perfectly underſtand the *Art of Phyſic*, ought to learn thoroughly the peculiar Conſtitution of every Seaſon. We come now,

31. *Secondly*, To conſider the Effects of *good* or *bad Water* on animal Bodies. *Water* being the Fluid wherein all Manner of Nutrition is conveyed to the ſeveral Parts of the Body, may properly be eſteemed the *Stamen* of Life, or that elemental Matter which principally conduces to the Growth of Bodies, and to the maintaining and preſerving them afterwards. For though pure Water, as ſuch, is not generally reckoned

the proper Nouriſhment of the Body, but chiefly the Vehicle thereof; yet it is ſurprizing to ſee how great a Share Water has in the Compoſition even of the moſt ſolid Parts. *Bones* which have been dried and kept till they were almoſt as hard as Iron, afforded, by Diſtillation, half their Weight of Water; and from the *Tendons* of an *Ox*, I have procured very near $\frac{13}{16}$ Parts of Water, as we ſhall give a particular Account of in the ſubſequent Chapter. Hence we may obſerve the fixed State of the watery Particles in animal Subſtances, which adhere ſo ſtrongly to the other conſtituent Parts, as not to be diſcovered in them, nor ſeparated from them, till they are expoſed to the Fire.

32. The Purity and Simplicity of Water, therefore, is of the greateſt Importance in regard to Health. *Boerhaave* * indeed tells us, he is convinced no body ever ſaw a Drop of pure Water. The utmoſt of it's Purity known, only amounts to it's being clear of this or that Sort of Matter. Even *Rain-Water*, which ſeems to be the pureſt of all Waters we know of, is replete with Exhalations of all Kinds, which it imbibes

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* Vide *New Theory of Chemiſtry.*

from the Air, or were raiſed up with it from the Earth; ſo that though filtred and diſtilled a *Thouſand* Times, there ſtill remain *Fæces* behind; and if it be let ſtand ſome Time, it corrupts and ſtinks.

33. But, not to carry our Inquiries ſo far as this, we may content ourſelves with finding out the ſeveral Degrees of Purity, by the different *ſpecific Gravity* of Water. *Hippocrates*, in his Treatiſe *de Aëre, Aqua, & Locis*, obſerves, that the *lighteſt* Waters are the beſt. And in his Aphoriſms*, he tells us, Water which is ſooneſt hot, and ſooneſt cold, is moſt light. For the Truth of theſe Aſſertions many Reaſons might be offered, were they neceſſary; but ſince all Phyſicians agree in it, it would be treſpaſſing on the Patience of the Reader to produce them.

34. Next to the Levity of Water, we are to take care that it be perfectly *inſipid* and *inodorous*; for it does not appear, by any Experiment, that pure Water has the leaſt Taſte or Smell. Hence, therefore, we may reaſonably conclude, that all Waters that have either Taſte or Smell, are impregnated with Salt, or Sulphur, or Vitriol, or

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* Vide *Aphor.* xxvi. Sect. 5.

Copper, or the like, and, conſequently, not proper for the common Diluent, or Diſſolver of our Food.

35. Hence alſo it is evident, that all ſtagnant, putrid, corrupted, Water is highly miſchievous, and capable of producing the worſt of Diſeaſes. Thoſe Waters that contain the moſt active, pungent Particles are moſt likely to produce *ardent Fevers.*

36. *Drinking too little Water*, or too ſmall a Quantity of watery, cooling, diluting Drinks, in Proportion to the ſolid Aliment, may have the following Effects:

I. The Blood-Globules will coaleſce, and the whole Maſs of Blood and Lymph will become too viſcous and thick, for want of proper Dilution.

II. In a viſcid State of the Blood and Lymph, the ſeveral Excretions are well known to be diminiſhed.

III. The ſaline and oleaginous Particles not being ſufficiently diluted for Excretion by the *Renal* Ducts, they will neceſſarily be accumulated in the Blood.

IV. The *Serum* of the Blood being the Receptacle and Vehicle of all animal Salts; conſequently, when it is in too ſmall a Quantity, the ſaline, ſulphureous, and bilious

Particles will be aggregated and united into larger Corpuſcles; whereby they will irritate, corrode, and paſs with Difficulty through the minuteſt and remoteſt *Tubuli.*

V. A Rigidity, or too great a Stiffneſs of the Fibres and Veſſels may proceed from inſufficient Supplies of ſuitable, diluting Drinks, to mollify and malax them, and to waſh off the acrid irritating Salts adhering to their Sides, or ſticking in their Interſtices.

VI. A Viſcidity of the Blood and Lymph; a Diminution of the Excretions; an Augmentation of the Quantity of ſaline and ſulphureous Principles in the Blood, and too great a Tenſity or Rigidneſs of the vaſcular Frame, are the only Requiſites neceſſary towards the Production of *acute continual Fevers,* as we ſhall prove in the Sequel of theſe Papers.

37. *Thirdly, Gluttony,* in regard to it's Frequency, and pernicious Effects, ought to be placed foremoſt of all the *Antecedents* to *acute Diſeaſes.* The bad Conſequents of this Vice are ſo very obvious and plain, that they have been remarked in every Age, to produce Legions of Illneſſes. *Solomon* * admoniſhes us thus: *Be not greedy in thy Ban-*

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* Vide *Eccleſiaſticus.*

quets, and give not thyſelf over to Meat; for in much Meat there is Sickneſs, and Greedineſs will turn to Choler. Many have died through Fulneſs, but he who is temperate lengthens his Life. Hippocrates * alſo cautions us againſt Exceſs after a very particular Manner, and endeavours, with all his Rhetoric, to inculcate *Abſtinence* and *Exerciſe. He who ſtudies his Health,* ſays he, *muſt not over-fill himſelf with Meat, nor be idle and lazy.* And, to mention no more, *Sanctorius*, in his admirable *Aphoriſms*, takes a deal of Pains to diſcover to us the malign and fatal Effects of Gluttony. *They need not fear any Diſtemper, who diligently take care that they be not over-charged with Crudities.* Aphor. 89. Sect. 3. And again, *If it be exactly known how much Food is convenient for every Day, ſuch a Perſon may eaſily preſerve his Health and Strength to a great Age.* Aphor. 34. Sect. 3.

38. Doubtleſs a well-regulated Diet has a principal Share in the Prolongation of Life. If the *Epicures*, or ſuch as indulge themſelves in ſenſual Pleaſures, and value the Gratification of their Palates and Taſtes before any Thing elſe, did but know or con-

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* Vide *Epidem.* Aphor. 10. Sect. 4.

ſider the incomparable Structure of their Bodies, of what delicately fine Filaments they are compoſed, and how eaſy it ſeems to be to deſtroy theſe *Stamina Vitæ*; they would ſurely be afraid to cram or gorge in the Manner they do. Such a ſuperfluous Load put upon their poor paſſive Machines, muſt needs wear them out much ſooner than ordinary, and would immediately put a Stop to their fineſt Springs and Movements, did not *Nature*, or the Strength of Conſtitution, or whatever you pleaſe to call it, find out Ways and Means to diſcharge the ſuperabundant Matter through the excretive Glandules, or to heap up ſo much Fat out of the Verge of the Circulation.

39. The Friction and Colliſion that neceſſarily follows upon the Impenetrability of Matter*, the Communication of Motion, and the Impreſſions of the Bodies that ſurround us, muſt neceſſarily rub off, and wear out ſome Parts from our bodily Machine. The neceſſary Colliſions that are made in our Juices, in breaking and ſubtilizing their Parts, to render them fit for the animal Functions: The various Secretions of what is not proper to be retained, or what is ne-

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* Vide *Cheyne*'s *Engl. Mal.*

ceſſary for the Preſervation of the Individual, make a continual Waſte of our Subſtance. To ſupply all which, it is abſolutely neceſſary that a due and equal Proportion of proper Nouriſhment ſhould be deſigned us: But whenever it happens that the Balance is caſt too much on either Side, that is, when the Excretions by the ſeveral Emunctories do not tantamount to the daily Recruits by Eating and Drinking, or *e contra*, ſome Indiſpoſition or other muſt follow.

40. Too much Uſe of any particular Sort of Aliment which tends to create an alkaline, acrid, or glutinous Quality in the Humours, may be ranked among the Cauſes of *ardent Fevers*. Thus living too much upon *Fleſh-Meats*, with rich and poignant Sauces, fires the Blood, and renders the Juices acrid and predatory; and is the original Cauſe of many Fevers: For when the ſolid Food is in too great a Proportion, either in Quantity or Quality, a greater Number of red Globules will neceſſarily be generated; and as they are naturally more receptive and retentive of Heat than the ſerous Part of the Blood; and as the Solids in ſuch Conſtitutions are generally very elaſtic and ſtrong, the Velocity of the Circulation, and the

Heat of the Body are oftentimes increaſed, by theſe means, to a vaſt Degree.

41. *Variety* of *ſavoury Diſhes* therefore, muſt be very unwholeſome, as they convey into the Blood great Quantities of *ſaline* and *ſulphureous* Particles, which are of great Activity, Solidity, Force, ſtrongly attracting, and withal firey, and cauſtic; eſpecially if they are too long retained in the circulatory Organs. Hence, as we ſhall ſhew hereafter, the ſeveral Series of Veſſels may be irritated and ſtimulated into more frequent and more forcible Contractions; the Friction between the ſeveral Orders of Blood-Globules increaſed, the Heat of the Body augmented, and the ſtrongly attracting Power of the Blood-Globules excited, ſo that the ſmalleſt Order may coaleſce into larger ones, and theſe again into others of the higheſt Order, and ſo on, till *ardent inflammatory Diſeaſes* are brought on, and ſometimes *mortal Coagulations.*

42. Hence it is evident that an *Exceſs* in the Quantity of *wholeſome Food* may too much increaſe the Quantity of the Fluids, and produce morbid Effects by ſending into the Blood more Chyle than can be properly aſſimilated by the vital Powers: In conſe-

quence of which, the Blood-Globules will grow too bulky, and incapable of paſſing freely through the minute ſanguinary *Tubuli*. But if the *Qualities* of the Aliment are unſuitable or incongruous to the Conſtitution, by it's abounding too much with *ſaline* and *ſulphureous* Matter, it will ſtill prove more morbific, on the account of theſe ſort of Particles attracting and being attracted by, and cohering with, ſome Parts of the Blood, ſo as to produce a greater Viſcidity in the animal Fluids.

43. No Perſon is able to ſupport a Diet of *Fleſh* and *Fiſh* without *Acids*, as *Salt*, *Vinegar*, *Bread*, &c. and without large Quantities of cooling diluting Drinks; for an Exceſs of all animal Food is ſure to occaſion an alkaline Diſpoſition of the Humours, and eſpecially all delicately flavoured Meats, as *Veniſon*, *Pidgeons*, &c. which greatly abound with Salts and ſubtile Oils: And in *Wild-Fowl*, and ſuch Animals as feed on animal Diet, the Salts and Oils are ſtill more active, and naked, and tend more ſtrongly to an alkaline Nature.

44. That all *animal Diet* is more apt to excite Heat than Vegetables, is moſt evident from common Obſervations, and the

Reaſon of this is certainly owing to the *Salts* of Animals being volatile and alkaleſcent; whereas the *Salts* of moſt Vegetables are of a fixed Nature, and aceſcent; and thence, when received into the Blood, remain inactive and quiet: Whereas the former, by the Heat of the Body, being volatilized and made more active, not only excite a greater Agitation in the Fluids, but ſtimulate the Solids into quicker and ſtronger Vibrations.

45. The ingenious and learned Dr. *Arbuthnot* hath lately inſtructed us how to regulate our Aliment. And *Boerhaave*, in his *New Theory of Chemiſtry*, aſſures us, that it intirely depends upon *Chemiſtry* to know when *animal* and when *vegetable* Food is proper; to what Conſtitutions *Water*, and to what *Wine* is beſt adapted; where *Bread*, and where *Fleſh* is to be uſed; what is the Diet requiſite for a Man of a ſtudious, ſedentary Life; what for a Man of an active Employ; and what for a Child; which Habits demand the Uſe of *Alkalies*, and which of *Acids*: with many other Particulars of the like kind. It is true, all theſe Things are diſcoverable by Experiments, made on the Perſons; but Danger attends

the making ſuch Experiments: whilſt Chemiſtry, without running any riſque at all, ſhews us, that the natural Heat of our Bodies will turn Vegetables acid, and putrefy animal Subſtances. Whence we may learn, that in caſe of an *alkaline* Diſpoſition of the Blood and Juices, when the *Urine* appears red, ſmells ill, and taſtes alkalious; *vegetable Acids* are the proper Diet, and *animal* Food prejudicial. On the contrary, if the Humours are *acid*, as frequently happens in *Infants* convulſed from a Coagulation of the Milk in their Stomachs, *Broths* made of the Fleſh of Animals, Eggs, or the like, are excellent; whilſt vegetable Acids would prove hurtful. And this can be learned from nothing but Chemiſtry; which alſo inſtructs us how to give each Kind of Food it's proper Sauce or *Menſtruum*, to forward it's Concoction or Diſſolution in the Stomach.

46. Hence more particularly appears the Inconveniencies ariſing from an Exceſs in any one Sort of Diet; for if it be ever ſo innocent, a long Continuance of it, without any Alteration, may diſpoſe the Humours to tend towards an *acid*, or an *alkaline* Diſpoſition: ſo that our *modern Diſhes*, which are ſo well fraught with *Salt* and *Spices*,

muſt needs be very prejudicial, eſpecially to thoſe of an indolent, lazy Temper, by rendering their Blood hot, acrid, and grumous, and the Fibres dry, criſpy, and tenſe.

47. If we conſider that the *Criſes* of almoſt all acute Diſeaſes happen either by rank and fœtid Sweats, thick, lateritious, and lixivious Sediments in the Urine, black, putrid, and fœtid Dejections; it will evidently appear that the *Riſe* of ſuch Diſorders is chiefly from *Gluttony*.

48. But, notwithſtanding all theſe Things, it is a common Obſervation among your *Free-Livers*, that if a Man is able to eat a great deal, it prevents, in a great meaſure, the ill Effects of ſtrong ſpirituous Liquors. Indeed, when the Appetite and Digeſtion remain good after a Courſe of repeated Debauches for many Years, it is an Argument of great Strength of Conſtitution, and that the *Fibrillæ* of the Stomach were originally very elaſtic and ſtrong: but to the thinking, intelligent Man, it will appear, that it is not cramming down a *Pound* or more of *Beef*, &c. the Morning after a *Drunken-Bout*, that preſerves the *Debauchee*; but, on the contrary, it helps to deſtroy him the ſooner, by laying a greater Load on the Veſſels,

which were before too full, and by that Means rebating the Elaſticity of the Fibres, and preventing their aſſimilating the Juices ſo properly as they ought. If therefore our Appetites are ever ſo keen after drinking too much, we ought to refrain large Meals, or Meats hard of Digeſtion, till the ſuperabundant Load is diſcharged through ſome of the excretive Glandules, and the Fibres are reſtored to their former Tone and Vigour.

49. But becauſe we ſeldom ſee *Drunkards* fail whilſt their Appetites remain good, *they* therefore conclude that eating a vaſt deal takes off the bad Effects of ſtrong, ſpirituous Liquors: Whereas, I beg Leave to aſſure them, the Fallacy of their Argument conſiſts in their Ignorance of the *Laws of the animal Oeconomy*, and the malign Influences that *Eating* and *Drinking* to exceſs, have on their Bodies, till they actually become viſible. A Man with ſtrong, robuſt Nerves, will bear many Shocks of this Kind before he gives way; and all the while the deſtructive Agents of *Gluttony* and *Exceſs* are privately undermining him, and deſtroying the Texture of the delicately fine *Machinulæ* of his Body, he flatters himſelf with the

Thoughts of Safety, till ſome Diſeaſe or other lays faſt hold of him, and makes him too ſenſible of his Miſtake.

50. *Acute Diſeaſes* are oftentimes the immediate Conſequents of this pernicious Cuſtom; and *chronic Diſorders* are much ſooner brought to maturity when *Gluttony* is joined with *Drunkenneſs.* I readily confeſs, where the Stomach is already depraved, or where the Nerves were originally weak and relaxed, *Drunkenneſs* will ſooner complete *chronic* Diſtempers, than in a Man who is ſtrong, and can eat heartily; becauſe of the vaſt Diſproportion of their Strength, it requiring, perhaps, ſome Years to reduce the latter to the ſame Standard of Weakneſs with the former. But what I inſiſt upon is, that a Man of a ſtrong, robuſt Conſtitution, whoſe Appetite does not fail him after a *Drunken-Bout*, may laſt longer by denying himſelf his uſual Quantity of Food, and by chuſing Meat of eaſy Digeſtion, with or after a Debauch, than if he indulges himſelf with the moſt luſcious Meats, and high-ſeaſoned Sauces.

51. As to ſpirituous Liquors, ſome certain Proportion of them may be abſolutely neceſſary for all Men, to excite, rouze, and

carry on the Circulation, Perſpiration, and all the Secretions and Excretions with their proper Force and Vigour; for the Way of Life which promotes a generous Perſpiration without inflaming, is the beſt Preſervative of Health, and greatly conduces to Longevity. But then, too free a Uſe of them, eſpecially of the ſtronger Kind, will render the Fibres rigid, and dry, and coagulate the Blood, from the vaſt Quantity of acrid Salts and volatile Oils they contain; which Salts and Oils being reduced *ad minima* by Fermentation, and Diſtillation, attract moſt ſtrongly, and by that Means fix and bind together the conſtitutive Parts of the Blood, ſo as to render it thick, black, and grumous.

52. The mere mixing of ſtrong Spirits with Blood heats it, by the inteſtine, fermentative Motion immediately brought on by the Action of the ſaline and ſulphureous Particles contained in both Liquors. *Boerhaave* * proves that Spirit of Wine being mixed with pure Water, increaſes it's Heat ſome Degrees; and certainly ſo heterogeneous a Fluid as the Blood, muſt produce more ſenſible Effects.

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* Vide His *Chemiſtry.*

53. And here I muſt obſerve what is evident by Experience, that the Excretions from the Blood are manifeſtly ſtopped by the Uſe of ſtrong, diſtilled Spirits: *Diarrhœas* and *profuſe Sweats* have been known to be checked by taking a little *burned Brandy*. Hence the ſure Effects of an inordinate Uſe of ſtrong, ſpirituous Liquors, are a *Stimulus* on the Veſſels, too great a Degree of Heat in the Fluids, a *Lentor* in the Blood, and a Diminution of the Evacuations.

54. *Fourthly, Immoderate and violent Exerciſe* is oftentimes an *Antecedent* to *acute Fevers*: For notwithſtanding Exerciſe is ſo very beneficial to the Body, that there is hardly any ſuch Thing as enjoying a good Share of Health without it; yet if it be uſed to an extreme Degree, it requires a deal of Care to prevent it's Inconveniencies.

55. When the muſcular Force is raiſed to it's higheſt Pitch, and continued ſo for ſome Time, it is almoſt inconceivable with what Celerity the Blood is puſhed on; the Friction between the Solids and Fluids is vaſtly increaſed; the Heat of the Body is augmented; the Juices are broke into their *Minima*; and by this Diviſion of their conſtituent Parts they rarify and poſſeſs a larger Space than

uſual: Whence the *Areas* of the tranſverſe Sections of all the Canals are inlarged, the Secretions are increaſed, and great Quantities of ſerous Matter are thrown off from the Blood; whereby what remains is rendered more thick and viſcous. Let us add, that Perſons heated to this Degree, are oftentimes deſirous of cooling themſelves; for the Sake of which they incautiouſly expoſe themſelves to the cool Air, or pull off their Cloaths, or drink large Quantities of cold, ſmall Liquors, or ſit upon the Ground, *&c.* whence it is great odds but the *perſpiratory* and *ſudatory* Veſſels or *Tubuli* are obſtructed, and *ardent* Fevers are oftentimes the Conſequents of ſuch indiſcreet Practices.

56. Another ill Effect of violent Exerciſe, if it be continued long, is the Inſpiſſation of the animal Fluids, and rendering them acrid and alkaline by mere Heat. *Ninety two Degrees* of Heat in the Blood, is found to be the Standard which preſerves the animal Fluids in that Conſiſtence, which beſt ſubſerves the Purpoſes of Life; but if it be increaſed ſome Degrees above this healthful Standard, the Blood and Lymph will grow glutinous and ſizy, and the Salts and Oils will be exalted and volatilized; as we ſhall

demonſtrate in the ſubſequent Chapters. The Blood of labouring Perſons is always more denſe than that of inactive People.

57. *Sydenham* obſerves, that the evident, external Cauſe of moſt Fevers is to be ſought from hence, *viz.* becauſe the Sick either left off Cloaths too ſoon, or after being hot with Exerciſe, expoſed himſelf unwarily to the Cold; upon which Account the Pores being ſuddenly ſtopped, and thoſe Vapours retained which would otherwiſe have paſſed through them, this or that Sort of Fever is kindled in the Blood, as either the general Conſtitution which at that Time reigns, or the particular Diſorder of the Humours is more inclined to this or that Sort of Fever: And I verily believe, ſays he, more have died on this Account, than by the *Plague, Sword,* or *Famine* all together. For if any Phyſician ſhall inquire ſtrictly of the Sick concerning the firſt Occaſion of their Diſeaſe; if it be of the Number of acute Diſeaſes, he will almoſt always find that either the Sick raſhly left off ſome Cloaths that he was accuſtomed to, or that he expoſed himſelf ſuddenly to the Cold, when his Body was heated with Motion; and that upon one of theſe Accounts he was ſeized with the Diſeaſe.

58. *Fifthly, Acute Fevers* may ariſe from a *Suppreſſion of any natural or accuſtomed Evacuation:* For the Matter which is retained generally gives a greater Saltneſs and Acrimony to all the Juices, and alters their Quality from a ſoft, unctious, into an acrid and irritating Diſpoſition. Beſides, when any Diſcharge from the Blood is ſuppreſſed, and no other is increaſed in Proportion, the Veſſels will neceſſarily grow turgid and full, from the Accumulation of that particular Humour; from a Plenitude of the Veſſels (if it be not carried too far) the Secretion in the Brain will be augmented; from a greater Quantity of nervous Juice, the Action of the Solids will be more vigorous; from a more frequent and ſtronger Contraction of the whole vaſcular Syſtem, the Circulation of the Fluids will be accelerated; and from a more rapid Motion of the Blood will ariſe a greater Degree of Heat, the moſt diſtinguiſhing Mark of a Fever.

59. Hence an unſeaſonable Uſe of *ſtrong aſtringent, ſtyptic Medicines* may lock up the excretive Glandules ſo as to produce an *ardent Fever:* As I remember it happened once, upon the Uſe of the *Bark, &c.* given to ſtop

an Evacuation, falſly imagined to be deſtructive to the Conſtitution.

60. *Sixthly, ſharp, pungent Pain,* eſpecially in the membranous Parts, will either cauſe or increaſe a Fever*; for it is always attended with a Contraction of the pained Part (as is evident from the *Bellinian Doctrine de Stimulis)* and by this Contraction, the Motion of the Blood and Spirits is either totally obſtructed or retarded, and the Part ſwelled; and by their Preſſure againſt the Sides of the Veſſels, more forcibly, as they will, when their direct Motion is hindered, the Pain is both increaſed and propagated further, and the Contraction is more or leſs communicated to all the Parts of the Body; whereby the Secretions and Excretions are ſtopped, and the Quantity of Blood increaſed, which will either cauſe or increaſe a Fever.

61. *Seventhly, Watching too much*; or ſitting up Night after Night, may be an *Antecedent* to this Diſeaſe, by obſtructing Perſpiration, and rendering the Fibres too ſtiff and rigid: For ſince by Sleep the whole Syſtem of the Solids is, in ſome Meaſure, relaxed, and as the Heat of the Bed greatly promotes the Excretion by the ſubcutaneous

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* Vide *Wainwright's Non-Naturals.*

Glandules, it evidently follows that the want of Sleep, and the warmth of the Bed, may produce the above-mentioned Effects.

62. *Eighthly, By intenſe and ſevere Study* the *Meninges* of the Brain, together with the other Membranes and delicate *Fibrillæ* of the Body, may be braced up too tight and ſtrict, and the Evacuations ſuppreſſed; as is manifeſt from the coſtive Habit of Body, which moſtly attends the Studious, and from the great Difficulty of getting to ſleep after intenſe Thinking.

63. *Ninthly,* It has been obſerved that thoſe who have died of *Hunger* and *Thirſt,* as at *Sieges* and at *Sea, &c.* have always died *delirious and feveriſh.* For as the Office of the Chyle is to attemperate, cool, and dilute the Blood, as well as to afford Nutriment to the ſeveral Organs of the Body; it muſt neceſſarily follow, that when this demulcent Liquor is wanting for ſome Time, the Blood will grow denſe, hot, acrid, and alkaline, to ſuch Degrees at leaſt, as will be ſufficient to render the whole Maſs, in a few Days, unfit for any of the Faculties of Life. For all the *paſſive* Principles of Putrefaction*, being actually in the Subſtance of

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* Vide *Phil. Tranſ.* N°. 414.

the Blood, and all the *active* Principles of Heat and Attrition being at work upon it to produce this Effect, it cannot fail to be brought about in a few Days; and the ſame would happen to all Animals, if what is effete, corrupted, or altered, ſo as to be unfit for the Uſe of the Animal, was not continually carried off by the *Emunctories*, and a freſh Recruit daily ſupplied from the *primæ Viæ*, which Evacuations and Supply being kept up in their due Proportions, effectually prevent all Putrefaction and Acrimony, and keep the Blood and Humours in their natural Temperature.

64. It is not then a Defect in the Quantity of Fluids that kills an Animal in Faſting, but a poiſonous Acrimony which the Blood and Humours naturally contract, for want of freſh Recruit and equal Evacuation. All Degrees of Digeſtion, from it's firſt Beginning in the Stomach, through it's whole Courſe, have a Tendency to Putrefaction; ſo that without a conſtant Supply of freſh, ſmooth, cool Chyle, the Humours will ſoon grow ſharp, acrid, and alkaline, and in a few Days degenerate into a fatal Degree of Putrefaction.

65. Hence, though too much Abſtinence, or faſting too long, is a thing we ſeldom or never meet with, unleſs by Compulſion; yet it is what we ought to take notice of among the *Cauſes* of *acute Fevers*, becauſe it really is one. Proceed we now to ſhew after what Manner the moſt uſual *Symptoms* incident to this Diſeaſe, ariſe from the *Antecedents*.

CHAP. II.

Of the Riſe *of the moſt uſual* Symptoms *incident to an* acute continual FEVER.

66. HIPPOCRATES, in his Books *de Morbis*, and that *de Affectionibus*, adviſes that none preſume to enter upon the Province of curing Diſeaſes, who have not firſt well conſidered their Cauſes. The great Affinity and Reſemblance there is between the Symptoms of different Diſeaſes, makes it abſolutely neceſſary for every *Practitioner* to rightly underſtand the Cauſe of each Symptom, and the Root from whence it ſprings; or otherwiſe he will be apt to miſtake one Diſeaſe for another, or in forming the true Indications, and the moſt effectual Method of Cure.

67. In deſcribing Diſeaſes we cannot be too careful in remarking the peculiar and perpetual *Phænomena* which characterize them; but as to the accidental or adventitious Symptoms, which ariſe from the different Temper, Age, Management of the Patient, *&c.* as they are almoſt innumerable, and

ſince many of them are collected in one Perſon, and none appear in another; it is almoſt impoſſible, as well as unneceſſary, to remark them all. The *Reader*, therefore, is not to expect that every one ſeized with a Fever is to have all the Symptoms we ſhall enumerate, or that he will never meet with others which are not taken notice of here: What we deſign being to explain thoſe which moſt deſerve our Attention; the chief *pathognomonic Symptoms*, whereby this Diſeaſe may moſt certainly be known from another.

68. From what has been ſaid in the preceding Chapter, it evidently appears that the *Body of Man* is to be looked upon as a moſt excellent Fabric, a very compounded Engine, conſiſting of groſs, hard, ſolid Parts, as well as Fluids of ſeveral Denominations, and Conſiſtencies; all which are inceſſantly and variouſly moved; and as long as the Solids act upon the Fluids, and the Fluids react upon the Solids equally and regularly, the Conſtitution is preſerved, and the Machine remains in perfect Order.

69. *A Diſeaſe*, therefore, ariſes from a Depravity of the Fluids, or Solids, or both; whereby the uſual Oeconomy is diſturbed, irregular Motions are excited among the

Solids, and unnatural Coalitions, and Separations among the Fluids. Or, if the Blood is not ſufficiently ſupplied with ſuitable Chyle, if all the Series of Veſſels are not duly repleniſhed with their proper Liquids; if the excrementitious, ſuperfluous, heterogeneous Humours are not ſufficiently excreted; if any thing be deficient or redundant in any Part of the Body; Health will be impaired, and ſome Diſeaſe or other will be the Conſequence of it.

70. Hence the Nature and Manner of Production of all the Symptoms incident to Diſeaſes, are to be deduced from the Structure and Oeconomy of the human Body, which always exhibits the *Phænomena* in Conſequence of it's primitive Conſtruction. And now if we look back to the *antecedent Cauſes* of this Diſeaſe, we ſhall find that all of them are diſpoſed to render the animal Fluids acrid, groſs, and viſcous, or to generate Obſtructions in ſome of the Outlets of the Body, whereby they augment the Quantity, Velocity, and Heat of the Blood.

71. Obſtructions are generally formed in the laſt Series of the Veſſels, or in the ultimate Branches of the ſanguine and lymphatic Arteries; and always ariſe from an

Exceſs in the Diameter of the obſtructing Matter above that of the Canal through which it ought to flow. Thus when one or more of the *Antecedents* form Corpuſcles in the Blood or Lymph of a different Texture, Figuration, or Bulk, than what are natural to the Conſtitution, and which are too large to paſs freely through the minuteſt *Tubuli*; or if too great a Stricture of the excretory Veſſels ſhould happen from a *Stimulus* applied to them, ſo that what is ſecreted by the Glands cannot be diſcharged out of the Body; it is plain to a Demonſtration, that morbid Matter would be pent up in the Habit.

72. *Thoſe* who are converſant in the *Practice of Phyſic* know that many of the Glands do not perform their Office as uſual, during the Continuance of an *ardent Fever*; the Dryneſs of the *Skin*, *Mouth*, *Larynx*, &c. are manifeſt Proofs of this: But whether theſe Symptoms proceed merely from an Incapacity of the Juices to be ſecerned, by reaſon of their Thickneſs, or from an actual Obſtruction or Stagnation of groſs Matter in the *ſecretory* or *excretory* Ducts, I ſhall not take upon me to determine; it being ſufficient for our Purpoſe, that the *Excretions* are diminiſhed, and the retained Matter

ter accumulated in the Lungs, Heart, and larger Arteries.

73. The Office and Uſe of the Glands in general, is to ſeparate and throw off from the Blood thoſe Recrements and worn-out Parts which are no longer required for any of the animal Functions, or to ſecrete thoſe Juices which are required for the Preſervation of the animal Machine; ſo that if we reflect on the Proportion which the ſeveral Glands bear to the reſt of the Body, and that the muſcular Parts receive but little Blood in regard to their Bulk; it will evidently appear, that Obſtructions to the Circulation of the Blood and Lymph through the Veſſels which conſtitute the Glands, will give the moſt immediate Riſe to *acute Fevers.* For ſuppoſing the *miliary, renal, meſenterial Glands*, or any other excretory Ducts, not to diſcharge their proper Contents from the Blood; thoſe particular Fluids muſt neceſſarily be accumulated in the pervious and patent Veſſels, contrary to the common Courſe and Deſign of Nature; and by being retained in the Habit longer than ordinary, they will grow ſharp, viſcid, and ill-conditioned.

74. Moſt of the *Phænomena* incident to Diſtempers take their Riſe from an Increaſe or Diminution of the Quantity of Fluids; for though the Blood may be vitiated, and Diſorders may ſeem to ariſe from thence, yet if we ſtrictly examine into it, ſuch Vitiation is generally occaſioned by an Augmentation or Diminution of the Quantity of Fluids: That is, the Quantity of the Fluids greatly depends upon their Motion, and their Motion upon their Quantity. Thus, for inſtance, an impetuous Circulation continued long, will render the Blood hot, acrid, and alkaline; whereas too ſlow a Motion will ſuffer it to be cool, grumous, and aceſcent: and when any of the Juices ſtagnate in their reſpective Veſſels, or lie out of the Verge of the Circulation, they will ferment, and turn putrid, from an inteſtine, fermentative Motion, occaſioned partly by the Heat of the Body, and partly from the Heterogeneity of their conſtitutive Parts.

75. Thus when any of the animal Juices grow too thick and tenacious, or when the groſs, earthy, ſaline Parts of the Blood abound too much; they are apt to adhere to the delicate fine Veſſels, and leave viſcid *Striæ* behind them; whilſt the watery, or more

ſerous Parts are eaſily ſqueezed forwards by the *Conatus* of the Sides of the Veſſels to come together; whence they may furr up the inſide of the Veſſels, and in the end totally occlude an infinite Number of the minuteſt *Tubuli*. But if this be not the Caſe, the neceſſary Effect of a viſcid State of the Juices, is a Retardment of their Circulation through the capillary Veſſels, and an Accumulation and Increaſe of their Velocity through the larger ones: And when ſuch a Number of the Parts of the Blood and Lymph are brought to coaleſce, as renders the Courſe of the Blood through the capillary ſanguine Arteries, and the Courſe of the Lymph through the minuteſt lymphatic Veſſels, difficult and ſlow; the Blood and Lymph will be accumulated in the largeſt and moſt pervious Tubes.

76. Hence the *firſt* Symptom of this Diſeaſe is a *Rigor*, or cold Chill, which chiefly affects the extreme Parts, and external Superficies of the Body, from the Check which is given to the Circulation, by reaſon of the *Lentor* adhering to the capillary Veſſels.

77. II. The *Pulſe are low and ſlow*, at the very Beginning of *acute Fevers*, for the ſame reaſon.

78. III. The Courſe of the Blood being more and more retarded in the ultimate Branches of the *Arteriolæ*, it will ſoon occaſion a quicker Flow in the larger Arteries, and the Circle of the greateſt Part of the Blood being, by theſe Means, ſhortened, the Return to the Heart will be quicker; in Conſequence of which, the Heart will begin to beat oftener, and the Heat of the Body will increaſe: For ſuch are the eſtabliſhed Laws of the animal Oeconomy, that theſe Things are only the neceſſary Effects or Conſequents of the Fabric or Mechaniſm of the Body.

79. We have many Reaſons to admire the Structure and Contrivance of the *animal Machine*, both as to the *Solids* and *Fluids*, which are ſo excellently adapted to the mutual Succour of each other, that one cannot be offended, but the other has immediate Intelligence of it. Thus when many of the minuteſt Veſſels are rendered impervious, the Quantity of Blood in regard to the patent Veſſels, is increaſed, each Canal is bowldened with it's reſpective Liquor, the Impulſe and Velocity of the Blood is increaſed in the larger Arteries, and as they are diſtractile Veſſels, the lateral Preſſion will be

greateſt when they are moſt diſtended. Hence,

80. IV. *A large, quick, full Pulſe* is the neceſſary *Concomitant* of a *Plethora ad vaſa* (if it be not carried too far) occaſioned by a difficult Circulation through the minuteſt and remoteſt *Tubuli*; and this is no more than an Effort of Nature to attenuate the Blood and Lymph, ſo as to paſs freely through all the decreaſing Series of Veſſels without Stagnation or Obſtruction.

81. V. *The Skin feels dry and hard, and the whole vaſcular Syſtem ſeems to be too elaſtic and tenſe.* Now this does not ſeem to be owing intirely to the Quantity of the Fluids diſtending the Veſſels; but to the Quantity of the *ſaline* and *ſulphureous* Principles in the Blood, being augmented by ſome of the *Antecedents*, or to their being attenuated and volatilized by an impetuous Motion and Heat, whereby they become more acrid, ſharp, and irritating; and conſequently they will ſtimulate the Fibres, and increaſe their Tenſion, to a greater Degree than before.

82. But ſince the *Theory of Diſeaſes* depends ſo much upon a true Knowledge of the Nature of the Elaſticity or Springineſs of the Fibres, that many *Phænomena* cannot

rationally be accounted for without it; I ſhall here preſent the Reader with a *chemical Analyſis* of the *ſolid Parts* of an *animal Body*, in order to inveſtigate the Proportions and Qualities of their ſeveral conſtituent Parts; whereby we may probably receive ſome Light towards finding out which Principles contribute moſt towards the Coheſion of the Fibres, and which actuate and invigorate their elaſtic, contractile Property.

EXPERIMENT I.

83. I took the *Tendons* from the *Legs* of an *Ox*, and having exactly cleared them from the *Membranes* and *Fat*, I put a *Pound* of them into a *Copper Body* which held *five Pints*; to this I fixed a *glaſs Still-head*, and to the Neck of the Glaſs-head I fitted a large *Recipient*, by means of a *wooden Plug* turned round for that Purpoſe, and having a Hole bored through it juſt big enough to admit the Neck of the Still-head. I alſo bored a ſmall Hole through the wooden Plug, and in that I fixed a glaſs Tube $5+\frac{1}{2}$ Feet high, whoſe Bore was $\frac{1}{6}$ Inch diameter. The Uſe of this Tube was to let out the Air that was generated and rarefied by Heat, or otherwiſe the Glaſs-head would have blown off,

or burſt, before we could have increaſed the Fire ſo as to raiſe the *volatile Salt* and *Oil*; and by reaſon of the Smallneſs of the Bore, and the Height of the Tube, we prevented the Eſcape of any Thing elſe: for we could not perceive, in any of the following *Proceſſes*, that either the volatile Salts or Oils ever roſe above eighteen or twenty Inches in the Tube.

84. The *Apparatus* thus prepared, and every Part being cloſely cemented together, I committed the Copper-Body to a *Sand-heat*, and, by a moderate Degree of Fire, raiſed all the *Phlegm*. The firſt that came over was almoſt inſipid and inodorous; after that it grew ſtronger and ſtronger, and, at laſt, about an *Ounce* of it was ſo highly charged with fœtid *Oil* and *Salt*, that it deſerved the Title of *Spirit*.

85. After this I took the Copper-Body out of the Sand-heat, and ſet it upon a *naked Fire*, which ſoon filled the *Glaſs-head* and *Recipient* with thick *Clouds*; and in this State I continued it as long as any thing would riſe.

86. *Laſtly*, I calcined the *Caput mortuum*, poured boiling Water upon the *Calx*, filtred it through Paper, and evaporated it to a

Dryneſs. By theſe Means I gained as follows,

	Ounc.	*Dr.*	*Grains.*
1. Lymph	xij.	vi.	
2. Volatile Salt		ij.	vi.
3. Oil		iij.	iiij.
4. Cap. Mort. before Calcin.	ij.	i.	x.
5. Cap. Mort. after Calcin.	i.	ij.	xxxxiiij.
6. Fixed Salt			
7. Loſt in Diſtillation		iij.	xxxx.
8. Loſt by Calcination		vj.	xxvj.

86. Thus we ſee how vaſtly the *watery* or *phlegmatic* Principle abounds above the other Principles; it being almoſt $\frac{13}{16}$ Parts of the whole Maſs. And indeed it is ſurprizing to obſerve how great a Share of Water goes to make up ſeveral Bodies, whoſe Forms promiſe nothing near ſo much: even *Bones*, as we have obſerved before, afford half their Weight of Water.

Exp. II.

88. I diſſected a *Muſcle* from the *Buttock* of a very lean *Bull*, and having cleared it from the *Membranes*, and all viſible *Fat*, I diſtilled a *Pound* of it, in the manner above-mentioned, and obtained,

	Ounc.	*Dr.*	*Grains.*
1. Lymph	xij.	iij.	xx
2. Volatile Salt		iiij.	Lv.
3. Oil	i.	i.	
4. Cap. Mort. before Calcin.	i.	ij.	
5. Cap. Mort. after Calcin.		vi.	xx.
6. Fixed Salt			
7. Loſt in Diſtillation		iiij.	xxxxv.
8. Loſt by Calcination		iij.	xxxx.

89. Here we may obſerve, that ſince *three Drachms* and *forty Grains* of Matter were loſt in the *firſt* Proceſs, and *four Drachms*, and *forty-five Grains* in the *ſecond*; and ſince ſuch Care was taken that nothing but *Air* ſhould eſcape, we may reaſonably conclude

that much the greateſt Part of that which was loſt, was *true permanent Air*; and for the ſame Reaſon, I doubt not, but a great Share of that which was loſt by *Calcination*, was *Air* likewiſe: For, as we ſhall ſhew hereafter, Air in ſolid Bodies, is of ſo fixed a Nature, that it will not riſe, or be ſeparated from them, but with the greateſt Degree of Heat.

90. Here alſo we have evident Proof of the *Proportions* and *Qualities* of the ſeveral *Principles*, or conſtitutive Parts of the Fibres; but in what Manner they are ranged, or after what Manner they cohere together, ſo as to be *ſpringy* or *elaſtic*, is a Queſtion not very eaſy to be ſolved. However, ſince daily Experience informs us, that when the animal Fluids are moſt of all impregnated with *volatile Salts* and *Oils*, the Fibres are highly rigid, elaſtic and tenſe; and when the *phlegmy* Principle abounds too much, they are ſoft, flabby, and relaxed; it is reaſonable to conclude, that though *Water* or *Phlegm* has much the greateſt Share in the Compoſition of the Fibres, yet the *ſaline* and *ſulphureous* Principles are the chief Agents which actuate and invigorate the watery and earthy Parts, and which, by their

ſtrongly attracting Power, are the greateſt Support of the Texture and Coheſion of the other Principles. The watery Part is eaſily ſeparated, and riſes with a ſmall Degree of Heat; but the ſaline and ſulphureous Principles adhere to each other, and to the earthy Part ſo tenaciouſly, that a great Violence of Fire is required to ſeparate them; and therefore they ſeem to be the ſtrongeſt *Gluten* which binds together the other conſtitutive Parts of animal Bodies.

91. I had almoſt forgot the *Air*, which certainly has a great Share in fixing and uniting the other Principles; for in the moſt ſolid Parts of the Body, or where the Coheſion of the Parts is the ſtrongeſt, there we find great Plenty of Air. That the Air-Particles are capable of being united, and fixed to ſolid Bodies, and by that Means may be eſteemed a Part of their Compoſition, we have many evident Proofs in Dr. *Hales*'s *Analyſis of the Air*; and that thoſe Particles do, in their fixed State, ſtrongly attract the other component Particles, is evident, it being well known that the moſt ſtrongly repelling and elaſtic Particles, when in a ſeparate State, are the moſt ſtrongly attracting when fixed to other Bodies.

92. Now, according to Dr. *Hales*, ſince a much greater Proportion of Air is found in the ſolid than in the fluid Parts of Bodies; may we not with good reaſon conclude, that it is very inſtrumental, as a Band of Union in thoſe Bodies; thoſe Particles (as Sir *Iſaac Newton* * obſerves) receding from one another with the greateſt repulſive Force, and being moſt difficultly brought together, which, upon contact, cohere moſt ſtrongly. And if the Attraction or Coheſion of an unelaſtic Air-Particle be proportionable to it's repulſive Force in an elaſtic State; then, ſince it's elaſtic Force is found to be vaſtly great, ſo muſt that of it's Coheſion be alſo. Add to this, that the Air generated from the ſolid Parts of the Body, is not ſeparated without great Violence; for it does not riſe till the Clouds do, which contain and bring over the Salt and Oil: Whence it is evident that the aëreal Particles are firmly fixed, and conſequently are very inſtrumental in the Union of the other conſtituent Principles.

93. † Small Bodies act upon one another in the ſame Manner, and by the ſame Laws and Mechaniſm, that the *Syſtems* of the

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* Vide *Optics*, Qu. 31.

† Vide *Cheyne*'s *Engl. Mal.*

greater ones do: And he who would underſtand the Effects of little Bodies, Fluids, or material Spirits upon greater Bodies, and the Nature of the Action of their Particles upon one another, has nothing to do (if he reaſons rightly) but to reſemble ſmall Bodies to great, under particular Laws and Conditions.

94. Since, therefore, there is in all the Fibres an innate Springineſs or Elaſticity, which ſeems to be owing to the cloſe Contact or Coheſion of their component Particles; and ſince too many *ſerous* or *watery* Particles ſoften or weaken the Cement between the *ſaline*, *ſulphureous*, *aëreal*, and *earthy* Parts, we may reaſonably conclude, that the Strength and Elaſticity of an animal Fibre is chiefly preſerved by the ſtrongly attracting Power of the ſaline, ſulphureous and aëreal Particles, which ſeem to ſolder and unite the watery and earthy Parts together.

95. The more Points the conſtituent *Machinulæ* touch at, the ſtronger will be their Coheſion; and conſequently they will give more Reſiſtance to any impreſſed Power, or require more Force to dilate or diſtract them; and when they are bent or ſtretched

out longer than uſual, they will vibrate, or return to their former Poſitions with a greater Velocity.

96. Hence it is that the Membranes and Fibres become unfit to be moved with Vigour, and are rendered ſtiff and inactive by Age; becauſe, in length of Time, their component Particles get into the cloſeſt Contact, and conſequently the *Copula* is more powerful and ſtrong.

97. From what has been ſaid it will moſt evidently appear, that in *acute Fevers*, where the *ſaline* and *ſulphureous* Particles of the Blood are exalted and volatilized, and where all the Fluids are more acrid, ſharp, and irritating, than uſual; the Fibres which conſtitute the Canals will be extremely elaſtic and tenſe, and their contractile Power raiſed to the higheſt Pitch: hence the Blood will be propelled out of the Heart with the greateſt Impetus, and it's Velocity increaſed to the greateſt Degree, through every pervious Veſſel. Hence,

98. VI. Ariſes *Heat*, which is the chief *pathognomonic* Sign of a Fever; for ſince it is well known that *(cæteris paribus)* the Heat of an Animal is in compound Proportion to the Quantity of the red Blood-Globules,

bules, (they being moſt receptive and retentive of Heat) and the different Degrees of Friction; or, in other Words, ſince the Heat of the Blood depends upon the Quantity of red Globules multiplied into their Velocity; it naturally follows, that where both the Quantity of red Globules (as we ſhall ſhew in the Sequel of this Chapter) and their Velocity are increaſed, the Heat muſt alſo.

99. The animal Solids and Fluids are in an inceſſant mutually vibrating State; the Canals contract and puſh on the Blood, the Blood recoils and reſiſts in Proportion, and as Action and Reaction are always equal, the Blood-Globules muſt neceſſarily, in a Fever, ſtrike much oftener againſt each other, and the Sides of the Veſſels; whence ſuch Friction is produced, as raiſes their Heat to a vaſt Degree.

100. We find, by daily Experience, that an accelerated Motion of the Blood, by Labour or Exerciſe, does conſtantly increaſe it's Heat; whence we may, with good reaſon, conclude, that it principally acquires it's Warmth by the briſk Agitation it undergoes at ſuch Times. And that the Heat of the Blood does ariſe principally from this Friction, is hence alſo probable, that on

ſtrong or briſk Motion of the Body, it's Heat is increaſed much faſter, than it could by any effervеſcent or fermentative Motion. * As, therefore, fermenting and effervеſcent Mixtures acquire Heat by the briſk Agitation and rubbing of the Particles of the effervеſcent Mixture againſt each other; ſo the Globules of the Blood may well acquire their Warmth by being briſkly agitated, in paſſing with great Velocity through innumerable, divaricating, and converging fine Canals.

101. We are not, however, poſitively to deny a fermentative Motion in the Blood: For it muſt needs be that the Parts of a Fluid, which is ſtored with ſo heterogeneous, active Principles, will be in a vibrating State, while actuated with ſo conſiderable Degrees of Friction and Heat, as the Blood is in an *acute Fever.* A violent Effervеſcence or Ebullition indeed, as from a Mixture of *Acids* and *Alkalies*, is what never happens in the Blood; but that there is always a ſmall Degree of inteſtine Motion, from the attracting and repulſive Power of the ſeveral conſtituent, heterogeneous Particles, is highly reaſonable to believe.

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* Vide *Hales*'s *Statical Eſſays*, vol. ii.

102. It is ſurprizing to think what vaſt Alterations different Degrees of Heat produce in animal Bodies. When it is intenſe, it has a very conſiderable Effect on the *ſaline* and *oleaginous* Parts; for though it is evident, from many Experiments, that the *eſſential Salts* in the animal Fluids, are, in a natural, healthy State, neither *acid*, nor *alkaline*, nor *fixed*, nor *volatile*, but of a *neutral* Quality; yet, in the Height of *ardent Fevers*, many of the Symptoms evince, that the Juices are tending towards an *alkaline* State; and by many obvious Experiments we learn, that the ſmootheſt Oils will grow rancid by Heat, and loſe their mild and gentle Nature, and become exceeding ſharp, corroſive, cauſtic, and poiſonous. The * Chyle contains a latent Acid; which eaſily diſcovers itſelf by Putrefaction; but this acid Salt having undergone a due Fermentation, or ſome other Action analogous to that in the animal Body, is changed into a volatile Alcali, obtainable in great Plenty from Blood, Serum, Bile, Urine, &c. In a healthy Body, however, theſe volatile Alcalies are never perfectly formed, the animal Salts being more of the Nature of Sal Armoniac, with a Mixture of earthy

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* Vide *Geoffroy* on *Animal Subſtances.*

and oily Parts, to which Mixture the glutinous Quality of the Blood and Serum is owing.

103. The Blood in a State of Health, is a ſmooth, demulcent Liquor, whoſe Globules both of the red and ſerous Parts are ſpherical and polite; but whenever the natural Forms of the component Parts are broken and deſtroyed, they muſt neceſſarily become angular, acrid, and pungent, and thereby, more or leſs, introduce an acrimonious Quality, which will weaken and deſtroy the vital Powers.

104. Heat and exceſſive Motion, therefore, ſeem to produce volatile, acrid, corroſive Salts in the Blood and Humours, by dividing and ſubdividing the Corpuſcles of the eſſential Salts, till they attain a certain Degree of Minuteneſs and Aſperity; but if ever the Heat be violent enough to render the animal Salts of an alkaline Diſpoſition, it is reaſonable to believe, that they are then conjoined, by their ſtrongly attracting Power, which is vaſtly increaſed by Heat, and the Diviſion of their Particles, to ſome other Matter, which, in a healthful State, is never in Combination with them. For ſince the ſaline and ſulphureous Particles do evidently

exiſt in the Blood before the Heat is applied to it, and yet exhibit no Signs of an *Alkali*; it plainly follows, that the Alteration is produced by the Union of ſome Principles, which thereby become different from what they were before the ſaid Combination.

105. Dr. *Cox* * is of Opinion, that *alkaline Salts* do reſult from the Combination or Union of the volatile Salts with the oleaginous or ſulphureous Principles; from which Mixture of the ſaline and oleaginous Particles, there reſults ſuch a *Tertium quid* as readily ferments with any *Acid.* And *Tachenius*'s Method of preparing *medicated Salts* from Vegitables by Calcination; *viz.* by condenſing the Smoak upon the Coals or Aſhes, whereby he procured more Salt, ſeems to confirm the Truth of this Suppoſition.

106. But however this wonderful Alteration is performed, we are aſſured by *Bellini* and *Boerhaave*, that the *White of Eggs* (and the very ſame thing will happen with the *Serum* of the *Blood)* will putrefy by Digeſtion, and turn *alkaline*; and that a *ſingle Grain*, or even half that Quantity of this putrefied Subſtance being taken into the Body, will, like the ſtrongeſt Poiſon, pre-

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* Vide *Phil. Tranſ.* No. 107.

ſently cauſe a violent *Nauſea, Vomiting, and Eructations, a Fever, a Diarrhœa, &c.*

107. Hence it is reaſonable to believe that in a *Cauſus,* or the moſt intenſe burning Fever, which laſts, perhaps, *twelve* or *fourteen* Days, the *Salts* and *Oils* muſt neceſſarily be rendered *alkaliſate,* though not in ſuch a Degree as to ferment viſibly with *Acids.* And hence it is that the Matter which is ſuppreſſed and pent up in the Body, by the *antecedent Cauſes,* or during the Continuance of a Fever, is vitiated, and of a noxious ill Quality; the Salts are attenuated and diſſolved, and the Oils are exalted and rendered volatile; in conſequence of which they gain a ſharp, acrid, corroſive Quality; the Salt which was before mild, and ſomewhat indiſpoſed to Volatility, becomes volatile and pungent; and the Oil, which before was gentle, and harmleſs, proves violently ſharp and rancid.

108. Another ill Effect of the *febrile Heat,* is tending to inſpiſſate or incraſſate the Blood, it being, in an intenſe Fever, ſometimes above the coagulating Point; and ſince the accelerated Pulſes, and the ſtrong vibratory Motion of the whole vaſcular Syſtem do neceſſarily continue to increaſe the Heat, it is amazing to think how the animal Machine can poſſibly hold out ſo long as it ſometimes

does, under ſuch violent Conflicts. Nothing could have preſerved it in ſuch Caſes, had not the great *Wiſdom* and *Foreſight* of the *Creator* ſo ordered it, that the accelerated Motion of the Blood, and the ſtrong vibratory Motion of the Veſſels greatly promote Attenuation at the ſame Time that they increaſe Heat: So that there is a Sort of reciprocal Action between the ſtrongly attracting Power of the Blood-Globules, aſſiſted by Heat, which perpetually inclines them to coaleſce, and the vibratory Motion of the Solids, which is continually daſhing the Globules and preventing their Coheſion.

109. But for a further Illuſtration of the Texture and Conſiſtence of the Blood, I have taken the Pains to examine it, in a *ſtatical* Way, in every Stage of this Diſeaſe where Blood could be drawn with Safety; in order to diſcover the different Proportions of *Serum* and *Gore*, and the different Powers of Coheſion between the red Globules which conſtitute the *Craſſamentum*.

110. But before we proceed to the Experiments themſelves, it may be proper to advertiſe the *Reader* of the Manner in which they were made. *Firſt*, I always took care to bleed into a Porringer as near the ſame Shape and Size as poſſible; becauſe a larger Surface of Blood ſhould not be expoſed to the Influence of the Air in one Trial, than in another. *Secondly*,

All the Blood was received in one Porringer, becauſe I have found by Experience, that a Pound of Blood does not ſeparate ſo much Serum when divided into ſeveral Parcels, as when contained in one Veſſel. *Thirdly*, I always ſet the Blood in a cool Place, and after it had ſtood 24 Hours, I very carefully weighed the *Serum* and *Cruor*, ſeparately, in order to find their different Proportions. *Fourthly*, I took a very thin Glaſs Tube 12 Inches long, and $\frac{1}{3}$ Inch Diameter, and having hermetically ſealed up one End of it, I blowed it out to an obtuſe Point about the Bigneſs of a middling Pea. Now this Point being ſet upon the *Craſſamentum*, the Weight of the Tube was not of itſelf ſufficient to preſs through, and but very ſeldom when filled with Water; ſo that my way of trying the Coheſion of the *Gore* was to pour Mercury into the Tube till it was juſt heavy enough to cut it's Way through; and as the Tube was exactly graduated, I could, by this Means, very nicely determine the Power of Coheſion between the Globules which conſtituted the *Craſſamentum*. *N. B.* Every Degree was $\frac{1}{8}$ Inch; ſo that when it is ſaid in the following Table *Degrees of Coheſion* N°. 48, we mean that the *Cruor* was ſo tough as to be equal to the Weight of ſix Inches of Mercury, beſides the Weight of the Tube, which was three Drachms, and fifty-ſix Grains.

The Age *of the* Perſon.	*The Day of the* Diſeaſe	*The* Symptoms.	*The Quantity of* Blood *taken away.*
A Man aged 45.	2d.	Intenſe Heat, Thirſt, Vomitings, Looſeneſs, excruciating Pains in the Head, Back, and Loins, and clear, pale, limpid Urine.	℥xiij. ℈ij.
A Woman aged 32.	1ſt.	A quick, full Pulſe, extreme Pain in the Head, and Loins, and delirious.	℥xiiij, ʒi.
A Man aged 23.	4th.	A foul, moiſt Tongue, crude Urine, ſtrong, full Pulſe, Delirium, exceſſive Heat, and frequent Vomitings.	℥xv, ʒij. gr. xxv.
A Man aged 42.	3d.	Great Incaleſcence, ſtrong, full Pulſe, a Pain in the Head and Back, giddy, and Nauſea Ventriculi.	℥xiiij, ʒj, ℈j.
A Boy aged 12.	2d.	A Phrenzy, with extreme Talkativeneſs, a wild Stare with his Eyes, a dry, brown Tongue, a thick, black Film or Skin adhering to the Teeth and Lips, Subſultuſes, and a quick, labouring Pulſe.	℥vj, ʒj.
A Boy aged 10.	4th.	A fluſhed Countenance, an extreme quick, full Pulſe, a brown, parched Tongue, with a white Liſt round it, a Delirium, high-coloured Urine, and coſtive.	℥vj, ʒij. gr. xij.
A Girl aged 11.	3d.	Exceeding delirious, a full, quick Pulſe, pale limpid Urine, a dry, parched Skin, and coſtive.	℥vij. ℈ij.
A Man aged 34.	5th.	A burning Heat, unquenchable Thirſt, general Uneaſineſs, Watchings, full Pulſe, and high-coloured Urine.	℥xij, ʒj. gr. xvj.

The Quantity of Serum.	*The Taſte and Colour of the* Serum.	*The Colour and Conſiſtence of the* Craſſamentum.	*What Days the* Criſes *happened, and by what* Outlets.
℥iij, ʒiij, ℈j.	Something more brackiſh than healthy Serum, and of a flaming yellow.	Very florid, except here and there a blue Speck. Degrees of Coheſion 34.	On the 7th Day, by Sweat, and turbid Urine.
℥iij, ʒv, ℈ij.	Almoſt inſipid, and of a wheyiſh Colour.	Extremely florid. Degrees of Coheſion 26.	On the 9th Day, by profuſe Sweats, and thick Urine.
℥iij, ʒj, ℈j.	Quick, ſaline Taſte, and ſtraw-coloured.	Exceeding florid. Degrees of Coheſion 38.	On the 7th and 8th Days, by an Hæmorrhage at the Noſe, plentiful Spitting, turbid Urine, and moderate Sweats.
℥v, ʒij, gr. xvj.	Brackiſh, and of a Citron Colour.	Of a vivid red, with here and there a ſizy Speck upon it. Degrees of Coheſion 43.	On the 7th Day, by turbid Urine, and profuſe Sweats
℥j, gr. xvj.	Very ſalt, and of a bright yellow flammeous Colour.	A thin white Coat at top, and florid underneath. Degrees of Coheſion 48.	Died on the 7th Day.
℥j, ʒiij, ℈j.	Brackiſh, clear, and flammeous.	Of a vivid Colour. Degrees of Coheſion 23.	On the 8th and 9th Days by moderate Sweats, and 5 or 6 looſe Stools.
℥ij, gr. xiiij.	Very pungent, and extremely yellow.	Of a vivid red. Degrees of Coheſion 26.	On the 10th Day, by Spitting turbid Urine, and ſwelled Legs.
℥ij, gr. xv.	Quick, ſaline Taſte, and of a bilious Colour.	Very florid. Degrees of Coheſion 56.	On the 11th and 12th Days, by profuſe Sweats, turbid Urine, and Spitting.

The Age *of the* Perſon.	*The* Day *of the* Diſeaſe	*The* Symptoms.	*The Quantity of* Blood *taken away.*
A Man aged 26.	1ſt.	Giddineſs, ſick Fits, great Incaleſcence, a ſtrong, full Pulſe, Pains in the Head and Back, and clear, limpid Urine.	℥xiiij, ʒij.
A Woman aged 22.	3d.	Excruciating Pains in the Head and Loins, extreme Thirſt, inward Burnings, dry, parched Skin, and ſtrong, full Pulſe.	℥xij, ʒj, ℈j.
A Man aged 24.	5th.	A very ſtrong, quick, full Pulſe, Vertigo, bilious Vomitings, intenſe Heat, and unquenchable Thirſt.	℥xiiij. gr. xxvj.
A Man aged 46.	2d.	A brown, dry, parched Tongue, Pains in the Head, and Back, general Uneaſineſs, and full Pulſe.	℥vij, ʒvj.
A Man aged 21.	4th.	A quick, full Pulſe, great Thirſt, Pain in the Head, giddy, clear, limpid Urine, and coſtive.	℥x. ℈ij. gr. viij.
A Man aged 38.	2d.	Great Incaleſcence, extreme Thirſt, bilious Vomitings, a parched Skin, and ſtrong, quick Pulſe.	℥xv, ʒij.
A Girl aged 15.	12th.	A Phrenzy, Subſultus Tendinum, a full, labouring Pulſe, intenſe Heat, and a parched, brown Cruſt upon the Tongue.	℥vi.
A Man aged 36.	13th.	A full, heavy Pulſe, lixivious Urine, a ſlight Pain in the Side, a quick and difficult Reſpiration, a black, parched Tongue, intenſe Heat, Subſultus Tendinum, and delirious.	℥viij, ʒj, gr. xvj.

The Quantity of Serum.	*The Taſte and Colour of the* Serum.	*The Colour and Conſiſtence of the* Craſſamentum.	*What Days the* Criſes *happened, and by what* Outlets.
℥iij. gr. xxxvj.	No Difference to be perceived from healthy Serum.	Of a good Colour. Degrees of Coheſion 22.	On the 6th Day, by 8 or 9 looſe Stools.
℥iij, gr. viij.	Pungent, ſaline, and ſtraw-coloured.	Exceeding vivid. Degrees of Coheſion 36.	The 8th Day, by Menſium Profluvium, and moderate Sweats.
℥iij, ʒv, ℈j.	Much more brackiſh than healthy Serum and deeper-coloured.	Very florid. Degrees of Coheſion 28.	The 11th Day, by profuſe Sweats, and thick Sediment in the Urine.
℥iij, ʒj, gr. xij.	Quick, pungent, and yellow.	A thin blueiſh Film at top, and florid underneath. Degr of Coheſion 33.	The 9th Day, by Spitting, Sweat, and thick, lateritious Sediment in the Urine.
℥ij, ʒiij. gr. xv.	Saline, and bilious.	Very vivid. Degrees of Coheſion 28.	The 5th Day, by an Hæmorrhage at the Noſe, and moderate Sweats on the 6th Day.
℥iij, ʒiiij, gr. vj.	Pungent, and very yellow.	A delicate red. Degrees of Coheſion 34.	The 7th Day, by profuſe Sweat.
℥j, ʒiij.	Very ſalt, and of a bright, flammeous Colour.	Florid, and without a Speck upon it. Degrees of Coheſion 28.	The 22d and 23d Days, by moderate Sweats, Spitting, and very turbid Urine.
℥j, gr. xxij.	Exceeding pungent, and of a deep bilious Colour.	A thin Buff-Coat at top, and more duſky than ordinary underneath. Degrees of Coheſion 64.	Died on the 19th Day.

111. Before we proceed to make any *theoretical* or *practical* Deductions from theſe Experiments, I beg leave to take notice of the Reaſons which induced me to draw away the Blood from one Patient on the 12th Day, and from another on the 13th Day of the Diſeaſe; eſpecially ſince I have endeavoured, in the following Pages, to ſhew the great Uſefulneſs of *Bleeding* in the *Beginning* of this Diſtemper, and the Danger of doing it towards the *Criſis*. *Firſt*, I was not conſulted for either of them till thoſe Days on which I drew Blood. *Secondly*, No Evacuations of any Kind had been made before thoſe Times. *Thirdly*, As to the *Girl*, it was about the Time of Age that we might expect the *Menſtruæ Purgationes*; Pains in her Back, Giddineſs, Retchings to vomit, *&c.* preceded this Illneſs; her Pulſe were full and weak, and ſeemed to ſtruggle for want of Room. *Fourthly*, As to the *Man*, the Day before I viſited him, he had taken an *Ounce* of the *Cortex*, his *Apothecary* miſtaking a little *Remiſſion*, for a true *Intermiſſion* of the Fever: *Subſultuſes, intenſe Heat, a difficult Reſpiration, and a ſlight Pain in the Side* ſoon followed the Uſe of the *Cortex*; and for theſe Complaints I found him taking *Bo-*

luſſes of *Lap. Contray. Crocus, Caſtor. Sal. Vol. Suecin.* &c. By this Treatment, I preſume, he became *delirious*, his *Countenance was fluſhed, his Tongue black and dry, his Urine extremely high-coloured, his Pulſe full, heavy, and ſomething unequal.* Theſe were the *Symptoms*, and theſe, in my humble Opinion, were ſufficient *Indications* for *Phlebotomy*, though ſo late in the Diſeaſe. I muſt add, that I never ſaw the Blood ſtream out ſo violently, and with ſo large an *Arch*, as it did from the Arm of the Man; and had not my Timidity prevented my taking away more Blood, I am perſuaded, I had ſtood a better Chance for the Recovery of my Patient. But to return.

112. From theſe Experiments it plainly appears, that in *ardent Fevers* the *red Globules* exceed the Proportion which they ought to bear to the *ſerous Part* of the Blood: for, according to Mr. *Boyle*'s Experiments and Obſervations of the Weights of the *Craſſamentum* and *Serum*, after they have ſeparated one from another, it appears that the Quantity of *Serum* which may be poured off from the *Craſſamentum*, is about *one Half* of the whole Maſs. And, indeed, from Experiments which I have purpoſely made on

the Blood of *three young Men* in perfect Health, I find it to be nearly the ſame; the *Serum* in all three Trials much exceeding *one Third* of the whole Maſs, though I cannot ſay that in any of them, it fully arrived to *one Half.*

113. Here we may alſo obſerve the different Conſiſtence of the *Cruor* in a *febrile* State, from that in Health. The *Degrees of Coheſion* in the Blood of the *three young Men* juſt mentioned, were 8, 9, 12, or the moſt viſcid of their Blood gave way to the Weight of 1½ Inch of Mercury: whereas we find in the *Tables* above, that the Coheſion of the Globules which conſtituted the *Craſſamentum*, was ſometimes equal to a Column of Mercury *ſeven* or *eight* Inches in Height.

114. Since, therefore, the Blood in *acute Fevers* is more than ordinarily viſcid and tenacious, and contains too great a Quantity of red Globules, notwithſtanding the uſual, moſt fluid Excretions are greatly diminiſhed, even from the very Beginning of the Diſeaſe; let us inquire by what Means this Alteration is moſt likely to be produced.

115. That accurate Obſerver of Nature *Leeuwenhoek* has ſhewn us that the largeſt

red Globules of the Blood are made up of *ſix* ſmaller Spheres cluſtered together in a very regular Manner; and that ſo nicely, that in a perfect Globule the Compoſition comes to be imperceptible. He likewiſe aſſures us, that he ſaw Globules in the Blood much leſs than thoſe which compoſed the red Globules; whence we may reaſonably conclude, there are ſeveral Orders of Globules in the Maſs of Blood, the ſmalleſt of which, if properly united to others, and thoſe again to the largeſt Order, exhibit red Globules. And, on the contrary, the largeſt Globules may be broken down into their compounding ſmalleſt Globules, and by that Means come again under the Denomination of *Lymph* or *Serum*.

116. Hence we may conclude, that whatever will diſpoſe the ſmalleſt Order of ſerous Globules to aggregate or unite into larger ones, and thoſe again into ſuch as are ſtill larger, will at laſt produce red Globules. Now we know of nothing more likely to produce this great Change than ſtrongly attracting, ſaline, and ſulphureous Particles, together with Heat, which invigorates their attractive Power, and thereby greatly con-

duces towards fixing and uniting the ſmalleſt Globules to each other.

117. From what has been ſaid in the preceding Chapter it is evident that moſt of the *Antecedents* are diſpoſed to charge or impregnate the Blood with ſaline and ſulphureous Matter; and, indeed, I can give no other Reaſon why one Man ſhould catch Cold, and have a Fever, and another, perhaps, ſhall have the perſpiratory Ducts more fully ſtopped, and yet have only a ſerous Defluxion on the *Noſe*, *Eyes*, *Lungs*, &c. but becauſe in one the Blood is more impregnated, by an intemperate Uſe of the *Non-Naturals*, with ſaline and ſulphureous Particles, than in the other; and for that Reaſon the Juices are more likely to become hot, acrid, and grumous, fit for the Production of a Fever.

118. To be a little more explicit: Let us reflect on the different States of the Blood under different Diſeaſes; e. g. in the *Leucophlegmatia*, *Anaſarca*, *Aſcites*, and indeed in all Diſtempers where the vital Powers are depreſſed, the Pulſe weak, low, and ſlow, and the Heat of the Body is much below the natural Standard; here, I ſay, we may obſerve how very apt the Globules of the higher Order are to loſe their Contexture, and to

be broken down into the ſmaller compounding Globules; ſo as to increaſe the Quantity of *Serum*. Whereas in *ardent Fevers*, where the ſaline and ſulphureous Particles abound too much, where the vital Heat is augmented above the healthful Standard, and all the Powers of the Body exert themſelves to the greateſt Degree; there we may obſerve the ſmalleſt compounding Globules intimately united into larger ones, whereby the red Globules increaſe, and the whole ſanguineous Maſs becomes more denſe, heavy, viſcid, and tenacious.

119. Hence we have good Reaſon to conclude, that the moſt neceſſary Requiſites towards forming of red Globules in the Blood, and cauſing theſe red Globules to coaleſce; are a certain Proportion of ſaline and ſulphureous Particles, and a certain Degree of Motion and Heat; whereby the conſtitutive Parts of the Blood are made to attract each other more vehemently.

120. *Heat*, which coagulates the *White of an Egg*, has not it's Effect merely by evaporating the moſt fluid Part, and thereby ſuffering the other Parts to approach nearer and nearer to each other; but it performs this ſudden and wonderful Change by in-

creaſing the attracting Power of the ſaline and ſulphureous Particles, whereby the ſmaller Order of Globules run into each other, and form larger ones; and theſe again join with others till the whole Maſs is conſolidated.

121. Thus it is with the Blood; a proper Quantity of ſaline and ſulphureous Matter, and a moderate Degree of Heat are perfectly neceſſary towards maintaining a natural and healthy *Craſis*; but whenever they are increaſed above, or decreaſed below the natural Standard either in regard to their Quantity, or Motion, the Blood will become too grumous, and florid, or too thin, limpid, and pale.

122. In regard to the Action of the Veſſels; if they have any Share in compreſſing and uniting the ſerous pellucid Globules of the Blood, and forming them into red Globules, we may reaſonably conclude that in *ardent, continual Fevers*, where the Action of the whole vaſcular Syſtem is greatly increaſed, the Globules will be moſt of all compacted and joined together.

123. From the Whole it appears highly reaſonable to believe, that a mere *Plethora* of languid, inert, unactive Matter, is not the

Foundation of *ardent Fevers*; but that the Blood, at ſuch Times, is too plentifully ſtored with acrid, ſharp, irritating, ſtrongly attracting, ſaline, and ſulphureous Particles. However, that nothing may be wanting towards inveſtigating the true Cauſes of this Diſeaſe, I have thought it worth while to ſeparate the conſtitutive Parts, or Principles of the Blood, and to take a juſt Eſtimate of their ſeveral Proportions.

124. By proper Diſtillations, and the Force of Fire, we may compel Nature to an Account; and though the Bulk and Figuration of the ſaline and ſulphureous Parts are undoubtedly much altered and commuted by the Action of Fire; yet the Proportions of the ſeveral Principles of the Blood are not increaſed or diminiſhed thereby; and conſequently by carefully ſeparating and weighing them, and ſeeing the ſeveral Proportions they bear to each other, we may arrive at a Knowledge very uſeful in accounting for ſome of the *Phænomena* of Diſeaſes, and directing us to a right Method of Cure. It is ſatisfying and uſeful as well as curious, to reduce to Meaſure and Weight the conſtituent Parts of the Blood; and I am perſuaded,

no inquiſitive Perſon will judge it a vain Undertaking.

A Chemical Analyſis of the BLOOD, *both in* HEALTH *and in ardent* FEVERS.

EXPERIMENT I.

125. *Eight Ounces* of Blood, taken from a young Man in perfect Health, and diſtilled in the ſame Manner, and with the ſame *Apparatus* above-mentioned, afforded as follows:

	Ounc.	*Dr.*	*Grains.*
1. Lymph.	vi.	iiij.	xxxxv.
2. Volatile Salt			xxxviij.
3. Oil.			Lij.
4. Cap. Mort. before Calcin.		vij.	xxv.
5. Cap. Mort. after Calcin.		ij.	x.
6. Fixed Salt			v.

126. The firſt three or four Ounces of *Lymph* ſeemed to contain but little *volatile Salt or Oil,* it being fœtid or diſagreeable either in Taſte or ſmell; neither did it fer-

ment ſtrongly with *Acids:* but the latter Part was highly impregnated therewith, and fermented violently with *Oil of Vitriol,* made a white Precipitate with *Solution of Sublimate,* and turned *Syrup of Violets* green.

EXP. II.

127. From *eight Ounces* of Blood, drawn from a Man, *fifty* Years of Age, in perfect Health, ſomething corpulent, and one who indulged in good Eating and Drinking, without uſing much Exerciſe, I obtained,

	Ounc.	*Dr.*	*Grains.*
1. Lymph	vj.	iiij.	xxv.
2. Volatile Salt			xxxxvj.
3. Oil		i.	xij.
4. Cap. Mort. before Calcin.		vij.	xxxvij.
5. Cap. Mort. after Calcin.		iij.	xv.
6. Fixed Salt			viij.

128. Two Grains of the *fixed Salt* being laid upon a Piece of clean Glaſs, I dropped upon it one Drop of *Oil of Vitriol,* from whence aroſe a violent Fermentation, and a white, pungent Fume.

129. Four Grains of the ſame Salt being diſſolved in two Ounces of Rain-Water, I added to it four Drops of a Solution of *Silver* in *Aqua Fortis*, which cauſed a manifeſt Milkineſs, and evidently diſcovered the fixed Matter to be *Sea-Salt* ; for no other Salt produces a white Fume with Oil of Vitriol, or a white Cloudineſs with a Solution of Silver.

EXP. III.

130. *Eight Ounces* of Blood extracted from a Man, on the *ſecond* Day of an *intenſe burning Fever*, afforded,

	Ounc.	*Dr.*	*Grains.*
1. Lymph	vj.	iiij.	vj.
2. Volatile Salt		i.	v.
3. Oil		i.	xxxij.
4. Cap. Mort. before Calcin.		vij.	xxvij.
5. Cap. Mort. after Calcin.		ij.	xxxxv.
6. Fixed Salt			iiijß.

EXP. IV.

131. *Eight Ounces* of Blood drawn from a Man of a robuſt Conſtitution, on the 4th Day of a moſt *acute Fever*, afforded,

1 Lymph

	Ounc.	*Dr.*	*Grains.*
1. Lymph	vj.	iij.	xxviij.
2. Volatile Salt		i.	xxxiiij.
3. Oil		i.	xxvij.
4. Cap. Mort. before Calcin.		vij.	Lvj.
5. Cap. Mort. after Calcin.		ij.	Liiij.
6. Fixed Salt			vj.

132. The fixed Salt in theſe Experiments exhibited the ſame *Phænomena,* with that in the preceding ones.

133. The Lymph in the two laſt Proceſſes ſeemed to be more ſtrongly charged with volatile Salt and Oil, than the others, and fermented more violently with Acids.

134. Theſe were the Proportions of the ſeveral Principles which the ſanguineous Maſs afforded us by the moſt careful Diſtillation, &c. Whence it is evident, that the ſaline and ſulphureous Parts did abound more in thoſe ſeized with *acute Fevers,* than in thoſe in *Health:* But as the Experiments may be thought too few to deduce any practical Inferences from, we ſhall ſtop here, till we have had an Opportunity of

examining more particularly into this Affair. Proceed we, therefore, to the other *Symptoms* of this Diſeaſe.

135. VII. *Pains* in the *Head, Back,* &c. ariſe from too great Diſtreſs or Extenſion of the Veſſels; for as all Pain proceeds from ſome Violence offered to the Nerves, either by too great Contraction of the Fibres, as in Spaſms or Cramps; or by an over Diſtenſion of the Fibres from Plenitude; or from ſome acrid, pungent, corroſive Matter irritating and corroding the Extremities of the Nerves; and ſince both the Quantity and Velocity of the Blood are mightily increaſed in *acute Fevers*, there muſt conſequently be more Blood contained in each Section of a Veſſel than what is common; and as every ſuch Diſtenſion is in ſome Meaſure a Solution of Continuity, it muſt of courſe excite *Pains*, and thoſe chiefly in the *Head, Back,* and *Loins*, becauſe there the Muſcles do not ſupport the Blood-Veſſels and reſiſt the Expanſion of the boiling Humours, as in other Parts of the Body.

136. VIII. *Vomitings* commonly happen in the Beginning of this Diſeaſe; from too great a Quantity of *Bile, Pituit,* and *indigeſted Matter* lying in the *firſt Paſſages*, and

fretting them into frequent, and violent contractile Motions. By inceſſant Vomiting freſh Bile or Choler is pumped up by the inverted Motion of the *Duodenum*, which gives a yellow Colour, and a bitter Taſte to what is vomited up. And at other Times, ſome *ſubacid* Juices, from the *Pancreas* and neighbouring Glands are brought up, which give a greeniſh Tincture to the *Gaſtric* Juice, or what is contained in the Stomach.

137. The *Bile* is an unctious ſaponaceous Liquor, which may be altered from a mild, uſeful Fluid, into one of a pungent, corroſive, pernicious Nature, merely by the Heat of the Body; eſpecially if it happens to be confined, or lie ſtagnant for ſome Time in the *Primæ Viæ*, and therefore ought always to be ſuſpected in the Beginning of *ardent Fevers*.

138. IX. *The unquenchable Thirſt* ſo much complained of in Fevers, ariſes partly from the Viſcidity and rapid Motion of the Blood, which is an Enemy to Secretion; partly from the Tenſion, or too contractile State of the ſecretory and excretory Ducts; and partly from the extreme Heat of the Body, which ſoon evaporates the moſt fluid Part of that little which is ſecerned; ſo that the

Tongue is diſcoloured with the Reſidue of it, and it's Fibres are left ſtiff and dry.

139. X. *The Breath is ſhort.* If we conſider the Reaſon why People grow ſhort-breathed by violent Exerciſe, as Running, *&c. viz.* by virtue of the Blood being more forcibly impelled into the Lungs, and accumulated in the *Pulmonary* Artery and Vein, we may reaſonably conclude that in a *Fever*, where the Quantity and Velocity of the Blood are greatly augmented, the ſhort and difficult Reſpiration ariſes from the ſame Cauſe. The Impulſe or *Momentum* of the Blood, when the Pulſes are vaſtly accelerated and ſtrong, ſeems to be ſufficient to keep the Lungs in a greater Degree of Diſtenſion than what is natural, and by that means will not ſuffer them to ſubſide ſo much as uſual in Expiration: Hence, as this Dilatation of the Lungs proceeds merely from the Force of the Blood in the pulmonary Artery and Vein, it evidently appears that the little Air-Bladders or Veſicles, which are ſituated immediately between theſe Blood-Veſſels, will be greatly compreſſed, and Inſpiration rendered difficult. But notwithſtanding the Impetus of the Blood in the pulmonary Artery is greatly

increaſed, it is not ſelf-ſufficient to expand the Lungs enough to promote a free Paſſage through the *Arteriolæ*, and conſequently a quick Reſpiration is perfectly neceſſary to unfold the corrugated Extremities of the Arteries and Veins, and to let the impetuous, boiling Blood paſs through them in proportion as it is derived from the Heart. Add to this, that ſince the Blood, in ardent Fevers, abounds too much with red Globules, it's Paſſage through the minuteſt ſanguine Arteries of the Lungs may be ſomething retarded, by which Means alſo Reſpiration may be more difficult.

140. XI. The *Urine* is but little in Quantity; ſometimes it is very flammeous or high-coloured; and at others limpid, clear, and pale.

141. The *Kidneys* are an Organ deſigned by Nature to throw out of the Body a recrementitious Liquor, which in Health is ſtraw-coloured, or of a pale yellow, and contains little or no Sediment, or feculent Matter; being in effect a *Lixivium*, in which a Portion of the animal Salts and Oil is diſſolved and waſhed away. If therefore, as we have Reaſon to believe, the ſecretory Ducts of the Kidneys are more than

ordinarily contracted, in an *acute Fever*, either by the ſharp, acrid Salts and Oil ſtimulating them as they paſs along, or elſe by the general Tenſion of the Veſſels at that Time; or if the Union or Attraction between the ſerous and globular Parts of the Blood is ſo ſtrong as not to be ſeparated by the *renal Tubuli*, we have a manifeſt Reaſon for the ſmall Quantity of Urine.

142 Another Cauſe, indeed, may be the Velocity of the Fluids; for a ſtrong and ſwift Circulation is an Hinderance to all Secretions, by Reaſon they are performed by lateral Branches going off at or near right Angles, and conſequently a ſwift Circulation or Motion along, or parallel to, the *Axis*, carries along with it what ſhould be laterally ſecerned.

143. As to the *Colour of the Urine*, that depends upon the Quantity of *oily* or *ſulphureous* Particles wherewith it is impregnated; it being well known that Oil or Sulphur is the Cauſe of all Colours in Liquors, ſince neither pure Salt, pure Water, nor pure Earth can communicate any Colour at all. Add to this, that *Oil* gives the deeper Colour, the more it is attenuated and exalted by Heat and Motion. And again, when the

increaſed Heat of the Body hath exalted the moſt fluid, aqueous Particles of the Blood, the Urine may become higher coloured, or intenſely red, by the Proximity of the ſulphureous Particles.

144. Hence we ſometimes meet with *Urine* ſo ſaturated with *oily*, *ſaline*, and *terrene* Particles, as to be a perfect *Lixivium*; and at other Times, when the Salts and Oil are not determined to the Bladder along with the Urine; that is, when the Fibres of the Kidneys are over and above contracted, or the Salts and Oil are not attenuated and divided enough to ſuit the Orifices of the ſecerning Ducts, the Urine is as limpid and clear as common Water. The former of theſe argues an *inflammatory* Diſpoſition of ſome of the inner *Viſcera*; and the latter threatens *Deliria*, and *Convulſions*, as we ſhall ſhew hereafter.

145. The *rank*, *fœtid Smell* which oftentimes attends the Urine of Perſons in *ardent Fevers*, proceeds from the Salts being volatilized and rendered all fine, and the Oil tending towards Putrefaction; all which is repugnant to the natural State of the Fluids.

146. Towards the *Criſis* of *Fevers*, when the ſaline, ſulphureous, and terrene Particles

are attenuated and ground fine enough to paſs through the *renal Tubuli*, the Urine is loaded with Contents, and lets fall a thick *Hypoſtaſis*, or turbid Sediment, after it has ſtood ſome time.

147. Since, therefore, the Urine, by it's ſeveral Contents and Appearances, furniſhes us with *Signs* as well *diagnoſtic*, as *prognoſtic*, it ought to be inſpected every Day, in order to deduce our *curative Indications*, or to make our *medical Prediction* with greater Certainty; either from the *Nubes* at the Top, the *Eneoræma* ſuſpended, as it were, in the Middle, or the *Hypoſtaſis* or *Sedimentum* ſubſided to the Bottom: The laſt of which is the beſt Indication of a kindly and regular Concoction.

148. Thus by daily inſpecting the Urine, we are taught the State and Progreſs of the Diſeaſe; and thereby enabled not only to make our Prediction, but we are alſo greatly directed thereby in our medicinal Practice. *Hippocrates* laid great ſtreſs upon this Obſervations on the Urine. And our own Countryman *Willis* is ſo ſanguine as to tell us, that the *Acidulæ* or Spaw-Waters do not more certainly ſhew the Nature of the hidden Mine, through which they are ſtrained,

than Urines give Teſtification of the divers Manners of Dyſcraſies of our Bodies and their Habitudes.

142. If, therefore, a bare Inſpection of Urines is of ſuch Advantage towards inveſtigating the Nature, State, Progreſs, and Cure of Diſeaſes; moſt certainly the *natural Hiſtory* of it, or a more curious Search into the Contents of the Urine, in every Period of the Diſeaſe, will be of more moment in diſcovering the ſeveral *Dyſcraſies* of the Blood, and in indicating the *Method of Cure*, than what we can meet with in the *Urinal* only. For this Reaſon I thought it worth while to make the following Experiments, that by an exact *Analyſis* we might ſee the different Contents of the Urine, and the various Proportions of it's Principles, in the ſeveral Stages of this Diſeaſe.

A Chemical Analyſis of the URINE, *both in* HEALTH, *and in acute* FEVERS.

EXPERIMENT I.

150. I took all the Urine that was made in the Space of *Twenty-Four* Hours, by a

Man, *Thirty-Five* Years of Age, in perfect Health, and of a regular Life; and ſhaking it together, I weighed out *Two Pounds*, and diſtilled it after the ſame Manner, and with the ſame *Apparatus* above mentioned. By theſe Means I gained,

	Ounc.	*Dr.*	*Grains.*
1. Lymph	xxx	vij	ij.
2. Volatile Salt		ij	xviij.
3. Oil.			xxxij.
4. Cap. Mort. before Calcin.		iiij	xvij.
5. Cap. Mort. after Calcin.		i	xxxxiij.
6. Fixed Salt			xxxij.

151. The greateſt Part of the Lymph was pellucid, inſipid, and inodorous, and exhibited no Signs of an *Acid* or *Alkali*; but the latter Part was very ſtrong and offenſive, and fermented violently with *Oil of Vitriol*, made a white Precipitate with *Solution of Sublimate* and turned *Syrup of Violets* green.

152. When the volatile Salt firſt began to riſe, it ſhot all over the *Glaſs-Head* and *Recipient* into moſt beautiful Cryſtals: Some

of which reſembled fine Boughs, or Feathers; whilſt others radiating from a Point or Centre, formed Stars or Roſes of various Sizes.

135. When the *volatile Oil* was mixed with an *Acid*, a ſtinking Vapour aroſe, which ſmelt like a naſty Corner where People have piſſed for a long Time.

154. I repeated this Experiment three Times, but as there was no material Alteration either in the Quantity or Quality of any of the Principles, it would be incroaching upon the Patience of the Reader to inſert thoſe Proceſſes; and as this was the Mean between the other Two, I have choſe it for the Standard of healthy Urine, whereby we may judge of all Variations from it.

EXP. II.

155. *A young Lad*, Ten Years old, being ſeized with an *acute Fever*, attended with a *Phrenſy*, *Subſultuſes*, and many other dangerous Symptoms; it continued till the *Eighth* Day, on which moderate Sweats broke forth, and the Urine let fall a vaſt *Hypoſtaſis*.

156. All the Urine which was made on the 8th and 9th Days, being ſaved by my

Order, it amounted exactly to *Two Pounds*; which being committed to the Still, and treated as in the former Experiments, it afforded,

	Ounc.	*Dr.*	*Grains.*
1. Lymph	xxx	ij	
2. Volatile Salt		v	xxxxvj.
3. Oil		i	xxiiij.
4. Cap. Mort. before Calcin.		v	iiij.
5. Cap. Mort. after Calcin		i	Lvj.
6. Fixed Salt			

157. Hence we may not only obſerve a great Difference between the Contents of healthy Urine, and that made at the *Criſis* of a Fever; but we plainly ſee the Reaſon of the vaſt Advantages which generally accrue when the Urine is loaded with Contents, and lets fall a thick and turbid Sediment: For we have good Reaſon to believe from this Experiment, that the greateſt Part of the *Hypoſtaſis* conſiſted of *ſaline* and *ſulphureous* Particles, which, whilſt in the Blood, irritated the Veſſels, and increaſed the Fever.

158. The Lymph alſo ſeemed to be much ſtronger in this than in the former Experiment; and as it contained more volatile Salt and Oil, it fermented more violently, and ſmelt ſtronger when mixed with *Oil of Vitriol.*

EXP. III.

159. *A young Woman,* 17 Years of Age, lay ill of an *ardent Fever,* and from the 10th to the 15th Day, the Urine came away involuntarily; ſo that none could be ſaved except about a Spoonful of limpid, clear Water on the 12th Day, at which Time ſhe was raving, gathered up the Bed-Clothes, catched at imaginary Flies, *&c.* On the 13th and 14th ſhe lay comatoſe. The 15th ſhe raved again, had ſtrong *Subſultuſes,* and a black, parched Tongue. On this and the next Day, we ſaved *Eight Ounces* of Urine, which was ſomething deeper coloured than a Citron, ſmelt ſtrong, and had a very thin, bright Cloud ſwimming in the middle. This Urine being diſtilled as above, we procured,

	Ounc.	*Dr.*	*Grains.*
1. Lymph	vij.	v.	
2. Volatile Salt			xxxx.
3. Oil			xxxij.
4. Cap.Mort.before Calcin.		i.	vj.
5. Cap. Mort. after Calcin.			xxj.
6 Fixed Salt			iiij.

Exp. IV.

160. The dreadful Symptoms which attended this poor young Woman on the 15th and 16th Days, were ſomething alleviated on the 17th, by a gentle breathing Sweat, which happened that Morning; but the *Remiſſion* was very ſhort, a *Rigor* ſucceeded, and the Fever ſeemed to return with greater Violence than ever. All that Night ſhe raved much. The next Day, *viz.* the 18th, I found her delirious, with frequent Catchings of the Tendons, and her Pulſe ſo extremely quick as ſcarce to be counted.

161. *Nine Ounces* of Urine being ſaved on the 17th and 18th Days, I diſtilled *Eight Ounces* of it, and obtained,

	Ounc.	*Dr.*	*Grains.*
1. Lymph	vij.	iiij.	xxxxv.
2. Volatile Salt			xxxxviij.
3. Oil			xxxiij.
4. Cap. Mort. before Calcin.		i.	x.
5. Cap. Mort. after Calcin.			xxiij.
6 Fixed Salt			iij.

162. It may be proper to obſerve, that about Four Ounces of this Urine, which was made during the little Remiſſion of the Fever, was highly red at firſt; afterwards it grew thicker and cloudy, and the next Morning it had a laudable *Hypoſtaſis* ſubſided to the Bottom. The other Part was much the ſame with that of the former Proceſs.

163. Having one Ounce of Urine to ſpare, and it ſmelling exceeding rancid and ſtrong, though the Glaſſes were very clean in which it was contained; I thought it worth while to try if I could poſſibly diſcover any *alkaline* Property in this Urine, before the Fire had any ſhare in it: And, accordingly, I divided it into four equal Parts; to the *Firſt* I let fall ſome *Solution of Sublimate*, which made

no Alteration in it; to the *Second* I dropped in ſome *Solution of Alum*, which alſo lay very quiet; to the *Third* I added *Oil of Vitriol*, which manifeſtly gathered together, and collected the groſſer thicker Contents of the Urine (which, by ſhaking the Bottle before we weighed out what was diſtilled, were equally ſcattered all over, ſo as to render it of an even turbid Colour) into little Rags, and left the Interſtices clear. With the *Fourth* I mixed *Oil of Tartar*, which immediately diſperſed the Thickneſs or Muddineſs, and rendered it clear and almoſt of a Straw-Colour.

164. Hence it is evident, that, though the Urine was not alkaline enough to raiſe a viſible Fermentation with Acids; yet as the ſaline and oleaginous Particles were undoubtedly attracted and collected together by *Oil of Vitriol*, and repelled and diſperſed by *Oil of Tartar*, we may reaſonably conclude that the prodigious Heat of the Body had exalted the animal Salts and Oil to an *alkaleſcent* State: For this was the moſt intenſe Fever I ever met with, and as the Heat had been continued for *Eighteen* Days, I am perſuaded it might be the Cauſe of theſe *Phænomena*.

EXP. V.

165. On the 19th Day of this young Woman's Illneſs, we had a Remiſſion for four Hours; during which Time ſhe came to her Senſes, drank plentifully, her Tendons were quiet, her Pulſe regular, in Compariſon to what they had been, and by the aſſiſtance of a *Clyſter* we procured two Stools. In the Evening the *Rigor* returned, though not with ſo much Vehemence as on the 17th. The *Fever*, *Delirium*, *Subſultus Tendinum*, &c. ſoon ſucceeded, ſo that the Night was paſſed with great Inquietude. On the 20th, in the Morning, ſhe had two Hours Sleep, which greatly refreſhed her, and ſlackened the Pulſe, both in their Hardneſs and Velocity. She now began to ſpit a good deal of frothy Matter; her Skin felt ſmoother and ſofter than it had done before; and the Urine on both theſe Days was loaded with Contents, and let fall a very thick *Hypoſtaſis*. *Eight Ounces* of this Urine afforded,

	Ounc.	*Dr.*	*Grains.*
1. Lymph	vij.	iij.	xxxij.
2. Volatile Salt		i.	xxxviij.
3. Oil			Liij.
4. Cap. Mort. before Calcin.		i.	xij.
5. Cap. Mort. after Calcin.			xxvj.
6. Fixed Salt			vß.

166. Having mentioned in the former Experiment, that *Oil of Vitriol* plainly collected, and *Oil of Tartar* as manifeſtly diſperſed the turbid Parts of the Urine, I was induced to try it again with ſome of this Urine, before Diſtillation; becauſe it ſeemed to be more impregnated with volatile Salts and Oil, and conſequently it might exhibit the *Phænomena* more plainly. Accordingly I dropped a few Drops of *Oil of Vitriol* into an Ounce of it, from whence a thin white Froth aroſe to the Top of the Mixture, whilſt the groſſer Contents run together, and, after ſome Time, ſubſided to the Bottom. The Ferment, indeed, was but weak, however it was enough to diſcover, to any unprejudiced Perſon, an *alkaline* Matter in the Urine. I muſt

I muſt confeſs, indeed, I have repeated this Experiment a great many Times on the Urine of other Perſons in *ardent Fevers*, and never could obſerve the ſame Appearances; but, as I ſaid before, ſince all the Veſſels, which received this Urine, were very clean, and ſince the Heat was moſt extreme, as well as of very long Continuance, I am poſitively ſure the *Phænomena* proceeded from an alkaline Diſpoſition in the Urine.

EXP. VI.

167. On the 20th Night this young Woman ſlept well. The next Morning I found her greatly refreſhed, though not free from the Fever. All that Day, and the next, ſhe continued mending; ſhe ſpit much, had little breathing Sweats, and a Multitude of Contents in the Urine. All the Urine ſhe made on the 21ſt and 22d Days being mixed together, and ſhook, in order to diſperſe the Contents equally, I diſtilled *Eight Ounces*, and obtained,

	Ounc.	Dr.	Grains.
1. Lymph	vij	iij	xx.
2. Volatile Salt		i	xxxxij.
3. Oil.		i	viij.
4. Cap. Mort. before Calcin.			Liiij.
5. Cap. Mort. after Calcin.			xxix.
6. Fixed Salt			iiij.

EXP. VII.

168. The critical Evacuations, by Sweat, Urine, and Spit, continuing on the 23d and 24th Days, my Patient was paſt all Danger; ſhe ſlept quietly, and only complained of great Laſſitude and Faintneſs: But as the Urine on theſe two Days continued to be very turbid and thick, I was invited to purſue my Inquiry, and from *Eight Ounces* I procured,

	Ounc.	Dr.	Grains.
1. Lymph	vij.	iiij.	v.
2. Volatile Salt		i.	xv.
3. Oil			Lvj.
4. Cap. Mort. before Calcin.			Lviij.
5. Cap. Mort. after Calcin.			xxvj.
6. Fixed Salt			iij.

169. The *Oil*, and latter Part of the *Phlegm*, or *Spirit*, which came over in this Proceſs, being left in the Recipient all Night, I found the next Morning, ſeveral large and beautiful *Cryſtals* ſhot from them, ſome of which were as large, and much reſembled the cryſtal Stones uſed for mourning Rings.

170. From theſe Five laſt Experiments we may plainly obſerve, that the *Urine* became more and more impregnated with *ſaline* and *ſulphureous* Parts in proportion to the Abatement of the bad Symptoms; till at the *Criſis* it contained more than double the Quantity it did at firſt. Hence the ſeveral Organs of the Body were vaſtly relieved, their Tenſion was abated, the Blood grew polite and ſmooth, and the Coheſion between the ſeveral Orders of Blood-Globules grew leſs and leſs, by a conſtant Diminution of the Quantity of ſtrongly attracting, acrid, irritating, ſaline, and ſulphureous Particles.

EXP. VIII.

171. A young Man, on the 6th Day of an *acute Fever*, made exceeding limpid, clear, and pale Urine, which was ſoon followed with a *Phrenſy*, *Subſultus Tendinum*, and

other

other dangerous Symptoms. From *Eight Ounces* of this Urine I obtained,

	Ounc.	*Dr.*	*Grains.*
1. Lymph	vij.	v.	xxxxviij.
2. Volatile Salt			xij.
3. Oil			xix.
4. Cap. Mort. before Calcin.			xxxxiiij.
5. Cap. Mort. after Calcin.			xxiij.
6. Fixed Salt			ijß.

172. It is an old Obſervation, founded on Experience, that if the Urine changes ſuddenly from a deeper Colour, to a crude Paleneſs without a Sediment, towards the Height of a Fever, it is the Forerunner of ſome fatal *Metaſtaſis*, as of *Deliria, Convulſions*, &c. And here, in this Experiment, we have plain Demonſtration of the Cauſe of it; *viz.* Becauſe the animal Salts and Oils are not determined to the Bladder along with the Urine, but are accumulated in the Blood, and irritate the *Meninges*, and delicate *Fibrillæ* of the Brain, increaſe the *Lentor* in the Blood and Lymph, and generate Obſtructions.

EXP. IX.

173. On the *Tenth* Day, the Urine of this young Man grew exceedingly turbid, with an even white *Hypoſtaſis* at the Bottom, and all the bad Symptoms vaniſhed. *Eight Ounces* of this Urine afforded,

	Ounc.	*Dr.*	*Grains.*
1. Lymph	vij.	iij.	xxxiij.
2. Volatile Salt		i.	xxxxv.
3. Oil		i.	vj.
4. Cap. Mort. before Calcin.			xxxxviij.
5. Cap. Mort. after Calcin			xxij.
6. Fixed Salt			vj.

174. Here again we have manifeſt Proof of what vaſt Advantage it is to the animal Oeconomy, to have the *Salts* and *Oils* properly attenuated, diluted, and drained off from the Blood, by the ſecerning *Tubuli* of the Kidneys.

176 Thus in the moſt natural Way of *analyſing* the Urine, without Fermentation or Putrefaction, or without the Addition of any ſuſpicious *Analyſer*, we have ſepa-

rated the ſeveral conſtitutive Parts of Urine; whereby we have evidently demonſtrated that the *Urine* in *Fevers* abounds more with *ſaline* and *ſulphureous* Particles than it does in Health; and eſpecially towards the *Criſis*, when the Salts and Oils are ſufficiently attenuated, ground, and comminuted, it is loaded with a Multitude of Contents which gives great Relief to the Sick: But when it is pellucid, pale, and clear, and continues ſo for ſome Time, it is a very dangerous *Phænomenon*, and requires the utmoſt Skill and Diligence to remove it. I ſhall only add, that the fixed Salt in all theſe Experiments, appeared, by the ſtricteſt Trials with Oil of Vitriol, and a Solution of Silver, to be Sea-Salt. Proceed we now to other Symptoms.

176. XII. *The Countenance is fluſhed and inflated; the Eyes look bright, and ſeem to ſtart out further than uſual.* If we conſider that the *Cheeks* are moſt plentifully ſtored with capillary, ſanguine, and lymphatic Arteries, as is evident in Bluſhing, it will obviouſly appear that whenever theſe Veſſels are more than ordinarily diſtended and tumid with Blood, the Countenance will be fluſhed and inflated; and for the ſame Reaſon, and the great Tenſion of the Veſſels, the Eyes

ſhine, and ſeem to protrude further than uſual.

177. XIII. *There is a total Loſs of Appetite.* In many Places we have already expreſſed our Admiration of the moſt excellent Machinery and Contrivance of the human Body; which is ſo wonderfully formed and put together, that each Part conſpires to the Preſervation of the Whole, and *ſecondary* Uſes are allotted to moſt of the chief Springs and Movements: But in no one Part of the Body is the great Wiſdom of the *Creator* more manifeſt than in the Stomach and Parts belonging to Digeſtion, which are moſt admirably contrived both to excite the Appetite, and to concoct the Aliment; and yet, in a *plethoric* State, where the Blood-Veſſels are already too full, and *Eating* would conſequently do much Miſchief, there the Appetite is generally palled. Thus in a *Fever*, where all *Fleſh-Meats*, or ſolid Aliment, would inevitably heighten the Diſeaſe, and deſtroy the Body; there the Secretion of the proper *Menſtruum* or *Diſſolvent* is interrupted, and for want of this Irritation, and from the Preſſure of the diſtended Blood-Veſſels on the Nerves, the

Stomach ſeems to be full, and loaths every Thing but cooling and diluting Liquors.

178. XIV. *Immoderate Watchings* are generally very tedious to People labouring under this Diſeaſe, and ariſe chiefly from an unuſual Contraction or Tenſion of the *Meninges*, and nervous *Fibrillæ* of the Brain. Or it may proceed from the firſt Beginning of an Inflammation on the Membranes: Whence a Relaxation proper for Sleep cannot be procured.

179. XV. A *Phrenſy* ariſes from a general Plenitude of the Veſſels, and the Acrimony of the *animal Salts* and *Oils*, which towards the *Height* of the Diſeaſe are rendered acrid, ſharp, and irritating, ſo as to prick and wound the delicate tender Veſſels of the *Cerebrum* and *Cerebellum*. Hence the *Ideas* are hindered from being communicated to the common *Senſorium* in a regular Manner, and conſequently the Diſcourſe of ſuch a Perſon muſt be irrational and inconſiſtent.

180. XVI. The Thoughts being in the utmoſt Confuſion and Hurry, and every Muſcle in the Body ready for immediate Contraction, the *Patient eats or drinks any Thing very greedily, and ſometimes requires three or four Men to hold him in Bed*; both which,

which; Experience has taught us to be very dangerous Symptoms.

181. XVII. The Pulſe continuing to beat quicker both in the Stroke and in the Time, and no Excretions being forwarded in due Order, the *Arteriolæ* oftentimes burſt, either in the *Noſe*, *Uterus*, &c. from mere Plenitude, and Violence of Motion: Whence large *Hæmorrhagææs* ſometimes enſue, to the great Relief of the Patient.

182. XVIII. *Petechiæ* ſometimes break out upon the Skin by Reaſon of the extreme Velocity of the Blood's Motion, or from the unſeaſonable Uſe of ſtrong *Sudorifics* and *Cordials*; which violently agitate and fuſe the Blood, divide the *Globuli*, and diſpoſe ſome of it's Parts to get into improper Veſſels: For when one Globule is divided into two or three, they then may be capable of entering into the lymphatic Arteries of the Skin, which before would not receive nor admit them when only one; and as theſe divided red Globules are ſtill too large to paſs the Pores, they will ſtick in the excretory Ducts of the ſubcutaneous Glands, and form *Petechial Spots*.

138. XIX. *Rank, fœtid, ungrateful Sweats* commonly ariſe towards the Decline of *ardent*

dent Fevers. It is generally thought that one great Uſe of the *fat, oily Globules* depoſited in the *Cells* of the *Membrana adipoſa* is to be reaſſumed into the Maſs of Blood, and to correct and blunt any acrid, ſharp, irritating Particles which may happen to get into the Blood. In moſt Diſeaſes we may obſerve the *adipoſe Cells* to empty apace; and particularly in acute Fevers the Heat not only melts down the fat *Globuli,* but it renders them, if continued long, *acrid,* and *alkaline:* Whence we may, with good Reaſon, conclude, that the rancid, ſtrong, offenſive Sweats proceed chiefly from the oleaginous Particles being exalted and volatilized.

184. XX. If ſome favourable Turn, or a *Criſis* ſhould not happen in a reaſonable Time, the Humours will corrupt and grow putrid, the Spring of the Fibres will decay, the vital Heat will languiſh, the Circulation of all the Fluids will grow feeble, and then the moſt grievous Symptoms of all will be introduced; *viz. a Coma, Subſultus Tendinum, Singultus, cold and clammy Sweats, and a quick, low, intermitting Pulſe.* For as the Blood, at this Time, runs into thick Grumes and Clots, Obſtructions will mul-

tiply in every Part, and thoſe in the Brain will render the Perſon comatoſe, as well as interrupt the Secretion of animal Spirits. From a Paucity of Spirits ariſe involuntary Twitchings in many Parts of the Body; and as the Contraction of every Organ is now extremely weak and irregular, the Pulſe are low, and intermit. *Laſtly*, The excretory Ducts of the *miliary* Glands being greatly relaxed, a profuſe Sweat breaks forth, which is cold, by Reaſon of the ſlow Motion of the Blood; and clammy, becauſe very viſcid Matter is now capable of paſſing the Pores of the Skin.

185. Theſe are the Symptoms which are generally obſerved to precede Death; for ſince ſuch a Relaxation or Weakneſs of the vital Powers, as is capable of producing theſe direful *Phænomena*, cannot rationally be ſuppoſed to happen till there is the greateſt Deficiency of animal Spirits, or till the *Vis Vitæ* is vaſtly decayed; ſo it is almoſt impoſſible for one in ſuch a Caſe to recover: The Circulation muſt neceſſarily ſtop, and the Veſſels collapſe.

186. Thus we have endeavoured to explain the Nature of this Diſeaſe, as far as the *antecedent Cauſes* and *Symptoms* are obvious

to our Senſes, and deducible from *mechanic Principles*; but we are far from imagining that every Thing is explored that ought to be known: There are many Things yet in the Dark, and ſome, perhaps, which will ever be beyond the Reach of our finite Capacities. However, we are not to be diſcouraged from ſeeking after them, becauſe we do not know but a proper Series of accurate Experiments, attended with diligent Obſervations, may diſcloſe every Thing that is neceſſary towards the *Cure*; to which we now proceed.

CHAP. III.

Of the Cure *of an* acute continual FEVER.

187. THE firſt and moſt requiſite Thing to be known in order to cure any Diſtemper, is the *State of the Fluids and Solids; viz.* whether the animal Fluids exceed or fall ſhort of their natural Quantity, or whether they have only contracted ſome morbid Quality. As to the *vaſcular Syſtem,* we are to examine whether it be too tenſe, rigid and ſtiff, or too ſoft, flabby, and relaxed: All which may eaſily be diſcovered by the Quantities and Qualities of the Excretions; by the State of the Pulſe; by the Hardneſs or Softneſs of the Skin and Muſcles; and by the *Antecedents*, if duly inquired into, and conſidered.

188. There is nothing conduces ſo much towards forming a right Judgment in curing Diſeaſes, as an exact Obſervance of their *natural Phænomena*; and to inveſtigate from what Sources they ſpring, after what Manner they ariſe, and what it is that ſupports

them at ſuch and ſuch Heights. Hence it is univerſally acknowledged, that the *true curative Indications* are to be taken either by diligently obſerving the Method which *Nature* commonly makes uſe of, to free herſelf from the Enemy; or elſe by making ourſelves perfect Maſters of the *ſpecific* Cauſe of the Diſorder. Since, therefore, we have taken great pains in delineating all theſe Things, in the above written *natural Hiſtory* of this Diſeaſe, we flatter ourſelves, that our *Method of Cure* is deduced from ſelf-evident Principles, and that it will be highly uſeful and inſtructive to *young Beginners*, becauſe it is moſt obvious and eaſy.

189. From the *Principles* laid down in the preceding Chapters, it may readily be conceived, that all the bad Symptoms of this Diſeaſe ariſe from the Blood and Humours being too *viſcous* and *thick*, and too fully impregnated with *ſaline* and *ſulphureous* Particles; whence the Courſe of the Blood is rendered more difficult through the minuteſt *Tubuli*; the Excretions by *Perſpiration*, *Sweat*, *Urine*, *Stool*, &c. are diminiſhed; too much Blood is accumulated in the more patent and pervious Canals; the Veſſels grow too ſtrict and tenſe; the Circulation becomes

too quick; and all the Humours, by their impetuous Motion, acquire a much greater Degree of Heat and Acrimony than what is natural, or conſiſtent with the well-being of the animal Oeconomy.

190. The *Cure*, therefore, manifeſtly conſiſts in leſſening the Quantity of Blood; in attenuating, diſſolving, and diluting the viſcid, glutinous Juices; in rendering the Fibres of the ſeveral Parts of the Body more ſupple and flexible, particularly thoſe which ſurround the ſecretory and excretory Ducts; in diminiſhing the too active and diſproportioned Force with which the Blood is impelled againſt the Sides of the Veſſels; and in ſheathing, ſubjugating, and deſtroying all acrid, ſharp, irritating Particles, abounding in the Blood and Humours.

191. In order to do theſe Things, we are convinced by Reaſon, as well as innumerable Inſtances which daily Experience furniſhes us with, that *Bleeding* is the firſt Remedy: For though it may be remarked that Bleeding, during it's Performance, increaſes the Blood's Velocity, eſpecially in the Canal which is cut, and it's correſponding Arteries, yet ſuch an Augmentation quickly ceaſes, and a ſlower Motion is ſoon the Conſequence

of the Blood's Diminution in Quantity. Beſides, when the Veſſels are in ſome Degree emptied by Bleeding, there being then a leſs Quantity of Blood in the Arteries and Veins, and conſequently a leſs Quantity paſſing in equal Times through the Heart, it finds proportionably leſs Reſiſtance from the precedent Blood; whence an Abatement in the Vigour of the Pulſe. And it muſt be confeſſed, that ſince diminiſhing the Quantity of Blood reduces the Force of it, ſo it increaſes the Softneſs of the Fleſh, and the Laxity of the Veſſels.

192. Dr. *Lobb*, in his *Rational Methods of curing Fevers*, has evidently demonſtrated the ill Effects of taking away Blood where there is no real *Plethora*, or where the red Globules bear too ſmall a Proportion to the ſerous Part; but where the Quantity of Blood in general is too great, or where the red Globules abound in too great Proportion, though the Quantity of that Compound, or mixed Fluid in the ſanguine Veſſels, does not exceed, *Phlebotomy* gives the moſt immediate Relief; becauſe the Blood being leſs forcibly propelled through the capillary Veſſels, after Bleeding, and conſequently un-

dergoing much leſs Friction, it grows ſenſibly cooler.

193. By the *ſtatical Experiments* above mentioned, we are convinced, that, in *ardent Fevers*, the red Globules of the Blood do bear too great a Proportion; and by other Obſervations we are well aſſured, that all the Series of Veſſels are too rigid and tenſe; whence the uſual Excretions by *Perſpiration*, *Sweat*, *Urine*, *Stool*, &c. are diminiſhed. Hence it naturally follows, that the Humours which ought, in a healthy State, to be excreted, are now accumulated in the Body, and by the prodigious Force of the vital Powers; by the Strength and Fulneſs of the Pulſe; by the fluſhed Countenance, ſwolen Veins, extreme Heat, *&c.* I am fully ſatisfied there is hardly any ſuch Thing as an *acute continual Fever* without a *Plethora* in ſome Degree or other, at the *Beginning* of it. Indeed, where the Strength is dejected; where there is no real Plenitude; where there is a ſmall, weak, obſcure Pulſe; where the Nerves, and whole vaſcular Syſtem, are lax; where the Habit is ſoft, pale, and fat, with ſmall Blood-Veſſels, *Bleeding* is moſt certainly improper: But, on the contrary, it is commonly obſerved, that this Diſeaſe is

peculiar to thoſe who abound in Blood and Strength, and are of a full muſcular Habit of Body, with large Blood-Veſſels, and who indulge themſelves in Eating and Drinking ſavoury and high-ſeaſoned Things.

194. The Neglect of Bleeding, therefore, at the Commencement of the Diſtemper we are treating of, is a Fault not to be compenſated in all the ſubſequent *Stadia*; the morbid Juices being not, as yet, prepared or concocted enough for any *critical* Diſcharge by *Sweat*, *Urine*, *Stool*, &c. If we omit this moſt ſalutary Evacuation, the *Plethora* will increaſe, the Blood and Lymph will grow more acrid, viſcous, and ſizy, and the capillary Veſſels may be ſo far diſtended, as to bring on *Deliria*, *Diſtraction of the Nerves*, *Inflammations of the Viſcera*, &c. All the cooling, refrigerating, diluting Medicines will avail but little without *Bleeding* beforehand; or if a *Sweat* happens to be forced out in the Beginning of a *Fever*, it will be very far from relieving the Symptoms, but will rather exaſperate them, by leaving the Blood more denſe, hot, and acrid.

195. *Bleeding* is pointed out even by *Nature* herſelf, as an Evacuation the beſt adapted to check the impetuous Motion of

the Blood, to unbend the Solids, and to promote a *Criſis*. How often do we ſee her ſet to work, and diſcharge the ſuperabundant Quantity by a ſpontaneous Eruption from the *Noſe*, *Hæmorrhoids*, *Uterus*, &c. when Bleeding has been neglected in the Beginning of the Diſeaſe, either through the Unſkilfulneſs of the Phyſician, or the Obſtinacy of the Patient? For when there is a Fulneſs of effervesſcent Blood; when the *Momentum* is too great, and the capillary ſanguine Arteries are violently diſtracted, it is no wonder that they burſt, and the Blood guſhes out where it meets with the leaſt Reſiſtance: *Quâ data porta ruit.* Nay, it hath been obſerved, that even after *Death*, large Bleedings have happened at ſeveral Parts of the Body; which further ſhews the great Neceſſity of drawing Blood in Time. Nothing can ſuggeſt the Uſe of *Phlebotomy* more plainly than theſe ſpontaneous Hæmorrhagies; and if we reflect on all the other Indications, the Advantages are ſo clearly demonſtrated, that it is (as *Willis* expreſſes it) *a Wickedneſs to omit it.*

196. If the Phyſician is to look upon his Patient's Body as an Engine out of order; though ſo conſtituted, that, by concurring

with the Endeavours, or Tendencies of the Parts of the Machine, it may be brought to a better State; if he find, that, in the preſent Diſpoſition of the Body, there is a Propenſity to throw off the Matter that offends it, in a convenient Way, and at commodious Places; he ought then to act ſo, as to comply with, and further that Way of Diſcharge, rather than another. It is the Duty of a Phyſician to tread in the *Footſteps* of *Nature*; and Experience teaches us, that whatever Method *Nature* takes to remove the Diſtemper, may, for the moſt Part, be attempted by Art, to the Advantage of the Patient.

197. Sometimes it happens that the Strength of the Body is oppreſſed with a ſuperabundant Load of Humours; or there is ſuch a Plenitude in the Veſſels, that it, in a great Meaſure, overcomes their Power; whence there ariſes a falſe Appearance of Weakneſs, and unleſs the *Equilibrium* be ſoon reſtored by Bleeding, there will be great Danger of a mortal Stagnation. By Bleeding in ſuch a Caſe, the Veſſels will be ſo far eaſed of their Burthen, as to be enabled to contract more eaſily, and to propel the

ſeveral Humours through their proper Canals, in a more regular Manner.

198. As to the *Quantity of Blood* to be taken away, we muſt make our Eſtimate from the Violence of the Symptoms, and the Strength of the Body; both which are beſt known by the Pulſe: *To wit*, whenever we meet with a ſtrong, full Pulſe, attended with bad Symptoms, it is the ſureſt Indication for Bleeding largely. The *Ancients* uſed to bleed till the Patient fainted, or very near it; but the *Moderns* think it more adviſeable, at leaſt in our *Climate*, to take away a much leſs Quantity, and to repeat the Operation according to the Urgency of the Symptoms. Indeed it requires the niceſt Judgment, the greateſt Sagacity, and the moſt exact Knowledge of the animal Oeconomy, to know when to bleed, and when not, and how much Blood ſhould be taken away.

199. The following *Precept* is founded upon Reaſon, and confirmed by daily Experience; *viz.* That it is always ſafeſt to ſtop ſomething ſhort of the full Quantity of Blood which may be ſpared, than offend the Strength by too profuſe an Evacuation: For whatever may poſſibly be found defective,

may afterwards be compenſated by repeating the Operation, or by promoting other Evacuations, ſuch as *Stool, Sweat*, or *Urine*. Whereas the Injury which may be done by too immoderate a Diſcharge of Blood, cannot be ſo eaſily repaired.

200. But however, there is no ſuch Thing as laying down Rules which will ſuit every Conſtitution; for as the *Concomitants* of Diſeaſes are very different in different Subjects; ſo alſo the Seaſon of the Year, the Habit of the Body, the Manner of Living, the Difference of Sex, the Age of the Perſon, the Bulk and Weight of the Body, with many other Things, are to be conſidered, before the Quantity of Blood, which is to be drawn away, can be adjuſted and determined. And therefore all that we ſhall ſay at preſent, in regard to *acute continual Fevers*, is, that whatever Quantity of Blood is thought proper to be let, it ought always to be done in the *Beginning* of the Diſeaſe; leſt ſuch an Evacuation towards the *ſtationary Period* ſhould interrupt *Nature* in bringing on a *Criſis*: For when the Diſtemper is far advanced, and the *febrile* Matter begins to be concocted and ſeparated from the ſounder Juices, the Plenitude is beſt carried off by

Sweat, Urine, Stool, &c. and not by *Bleeding*. Whoever maturely conſiders this, will ſoon underſtand why *Galen* adviſes *Bleeding* early in this Diſtemper, and not when the morbid Matter is concocted.

201. But to carry this Inquiry further, it will be proper to examine into what Part of the Body, or from what *Vein* the Blood ought to be drawn, when ſuch and ſuch *Phænomena* appear; ſince much has been ſaid concerning *Derivation* and *Revulſion*, and ſince great Streſs ought ſometimes to be laid upon them in curing Diſeaſes.

202. By *Revulſion* is commonly meant, *a driving back, or turning a Flow of Blood from one Part of the Body to another*. But this is ſuch an obſcure Way of expreſſing it, that no one is ever the wiſer for it: It appearing at firſt Sight, at leaſt to thoſe who have been converſant in the *Laws of the animal Oeconomy*, to be abſolutely impoſſible for the Blood to be driven back, or made to flow both Ways in the arterial Tubes.

203. By *Revulſion*, therefore, I would be underſtood to mean (though perhaps the Term is not very adequate to my Meaning) *whatever will leſſen the Quantity of Humours circulating to any given Part of the Body*.

And this can be performed no other Ways, than by diminiſhing the *Areas* of the *tranſverſe Sections* of the ſeveral Veſſels leading to, or properly belonging to the Part affected; or by abating the Velocity of the Fluids.

204. The *firſt* of theſe is, properly ſpeaking, the only true Way of making *Revulſion*, *to wit*, by diminiſhing or contracting the Diameters of the Veſſels. Thus, for inſtance, if we would make a *Revulſion* from the *Leg*, dipping it in *cold Water*, applying *aſtringent Medicines* to it, or rolling it up in *Swathes*, or *laced Stockings* will anſwer the End, by ſtimulating, contracting, and preſſing upon the Veſſels, whereby their Cavities will be leſſened, the Reſiſtance and Friction between them and the Fluids will be increaſed, and conſequently the Quantity of Humours flowing to the *Leg* will be diminiſhed in Proportion as the *Vis inertiæ* prevails.

205. Hence it appears, that *repelling Medicines*, as they are commonly called, do not produce their Effects by driving back the Humours already received, through the ſame Veſſels they arrived in, that being abſolutely inconſiſtent with the *Laws of the Circulation*; but they do it, by contracting

and diminiſhing the *Areas* of the *tranſverſe Section* of the ſeveral Series of Veſſels, whereby they propel the ſluggiſh, ſtagnant Fluids on the Courſe of their Circulation; that is, through the capillary, ſanguine, and lymphatic Arteries, into the capillary, ſanguine, and lymphatic Veins; and they prevent a freſh Afflux of ſo large a Quantity of Blood and Lymph again, as long as the Influence of theſe Medicines is capable of giving proper Reſiſtance to the Impulſe of the reſpective Fluids.

206. The *Second* Way of *repelling*, *to wit*, by abating the Velocity of the Fluids flowing to any Part, is, properly ſpeaking, *ſecondary* to, or the *Conſequence*, of *Derivation*. As, for Example, a *Revulſion* may be made in this Senſe, by *Bleeding*, *Purging*, *Vomiting*, *Sweating*, or whatever will cauſe a *Derivation* of more Matter into any particular Part of the Body. Thus *Bleeding* in a *Vein* which ariſes from any of the ultimate Branches of the *Aorta deſcendens*, will make a *Revulſion* from every Part belonging to the *Aorta aſcendens*, and *vice verſa*, *Purges* and *Vomits* derive a greater Quantity of Blood into the *cæliac* and *meſenteric Arteries* than commonly circulates through them,

and thereby they decreaſe the Quantity which would otherwiſe flow to the *Head, Limbs, and external Superficies of the Body. A profuſe Sweat,* as it is the greateſt Evacuation which can poſſibly be made from the Blood, in the ſame Space of Time; ſo conſequently it makes the greateſt *Revulſion* from the *Viſcera,* and from the whole *internal Superficies,* by deriving the greateſt Quantity of Lymph to the *ſudatory Veſſels.*

207. Hence it appears, that an animated human Body is not a mere *Statue,* or *Congeries* of the Materials it is compoſed of; but an admirably framed Engine, conſiſting of *ſolid, liquid,* and *pneumatic* Subſtances, ſo exquiſitely adapted to their reſpective Functions and Uſes, that an Alteration cannot be made in one Part, but it will produce it's Effect in another. A *Derivation* in one Place, will occaſion a *Revulſion* in another, *& e contra.*

208. And here I beg leave to inquire whether the late learned Dr. *Friend* was not miſtaken, in aſſerting in his *ſecond Commentary on Fevers, That Bleeding in the external Jugular Vein is not only the moſt compendious and expeditious of all Revulſions, but alſo the*

very ſtrongeſt of thoſe which are made from the Brain.

209. I ſhall make no Apology for diſſenting from the Opinion of ſo great a Man; becauſe in the *Practice of Phyſic* we are not to regard *Authors* ſo much as the Force of Reaſon. His Sentiments, indeed, (to ſay the ſame of *Him* as he did of *Galen)* oftentimes induſtriouſly to deſpiſe or reject, as it would be a Mark of great Arrogance, ſo, to be willing to follow him in every Thing, of much Superſtition.

210. Too much Credulity in Matters of Phyſic has been a principal Cauſe of the ſlow Advancement of that Art. An abſolute Reſignation to the Opinion of any Man, how great ſoever, without taking proper Pains to judge, examine, and ſearch into the Truth of it, is a ſlaviſh Submiſſion, and very unbecoming a rational Creature. Let *great Authors*, therefore, (ſays the ſagacious Lord *Bacon* *) have their Due; but ſo as not to defraud Time, which is the *Author of Authors*, and the *Parent of Truth.*

211. After Dr. *Friend* has ſhewn the Antiquity and Safety of Bleeding in the Jugular Veins, in regard to the Operation, he

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* Vide *General Survey of Knowledge.*

tells us *, "They are opened for the Sake "of either making a *Derivation* or *Revulſion*; that the Blood flows in a greater "Quantity into the Parts affected, is occaſioned by *Derivation*, and with a leſs, "by *Revulſion*. Which Words, although "they are ancient enough, yet no one will "be able to underſtand them, nor conſequently to determine juſtly the Laws of "opening them in either Kind; unleſs the "Structure of the Veſſels and the Motion "of the Blood be accurately known.

"Therefore in Diſeaſes which affect theſe "Parts, from whence the Branches of the "external Jugular ariſe, *e. g.* in a Quincy, "Ophthalmy, and Tumours in the Face; "when we cut the Trunk of this Vein, it "is plain we do it to cauſe a *Derivation*, "if we would be ſuppoſed to mean any "Thing by this Word, diſtinct from Revulſion. For this Paſſage being opened, "and the Reſiſtance removed, which the "Blood pent up in the extreme Veins ſuſtained from that, which is contained in "the Trunk of the Jugulars; the Blood "flows with greater Liberty from the *Carotid Artery*, which we have ſaid to be

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* Vide II. *Comment. on Fevers.*

" joined with the Extremities of this Vein, " and circulates ſwifter through the Part " affected; ſo that there is a larger Quantity of Blood derived into it, at the very " Time of making the Inciſion, than when " the Vein was not opened. Therefore, by " opening the Jugulars in ſuch a Caſe as " this, the Blood acquires that Force by it's " Celerity, as to be able to propel, and carry " off, any Matter remaining in the ſmalleſt " Branches, and obſtructing the *Arteriolæ*; " almoſt after the ſame Manner, as the " opening the *Saphæna* brings down the " *Menſes*.

" But this letting of Blood, from the *external Jugular*, not only removes the Obſtructions and Inflammations that ariſe " without the *Cranium*, but it greatly relieves thoſe alſo which ſeize the *Brain* " and it's Membranes. For when the *Jugulars* are emptied in Diſeaſes of the " Brain, a *Revulſion* is made in the Part " affected: Which, ſays he, I ſhall explain " a little more diſtinctly, becauſe I hear " ſome Things objected againſt it; as if the " Brain could not be relieved by this Method of Evacuation, becauſe the *external* " *Jugular* carries nothing from it, neither

" has it any Communication with the *inter-*
" *nal Carotid*, which moiſtens the Brain.
" This indeed is a ſpecious Argument: But
" I ſhall eaſily prove to any experienced
" *Anatomiſt*, that however true that Reaſon
" may be which is drawn from the Struc-
" ture of the Veſſels, yet what they gather
" from thence is ſo very far from the Truth,
" that, for that very Reaſon, the contrary
" Concluſion ought to be made.

" That this may the more clearly appear,
" we muſt recollect from what has been
" ſaid, that the *carotid* Artery is divided
" into two Branches, the external and the
" internal, of which this is joined at the
" Extremity with the internal *Jugular*, and
" that, in the like Manner with the exter-
" nal. When, therefore, the Branches of
" the internal *Carotid* are ſeized with an
" Inflammation, the *Niſus* of the Blood,
" and the elaſtic Power of the Veſſels, re-
" main in a State of *Equilibrium*, as if they
" were tried with equal Weights; the one
" being diminiſhed, the other increaſes:
" But if by opening a Vein we draw off
" ſome Part of that Blood which is wont
" to be carried into the Veſſels of the Brain,
" that Force, with which the Maſs of
" Blood

" Blood preſſes the *Arteriolæ*, will be diminiſhed, and conſequently the Heat, and " that Rarefaction which follows it, will " decreaſe; ſo that the Coats of the Veſſels " having, as it were, recovered their Liberty, are able more ſtrongly to contract " themſelves, and to force out whatever may " remain in the very narroweſt Paſſages."

212. In ſhort, the *Doctor* contends, *That Bleeding in the external Jugular diminiſhes the Quantity of Blood flowing to the Brain; and for that Reaſon, he ſays, it is the moſt proper Evacuation in a Phrenſy which follows upon a Fever.* In anſwer to which, I beg leave to obſerve,

I. What Effects the laying a Ligature on the *external Jugulars*, ſo as to diſtend them fit for opening, is likely to produce, when the ultimate Branches of the *internal Carotid* in the Brain, are ſo much diſtracted with groſs, viſcid Blood, as to bring on a *Phrenſy*.

II. What immediate Effects the opening of the *external Jugular* is moſt likely to have on it's correſponding Blood-Veſſels, and thoſe in the Brain.

III. What the Conſequences will be in ſome little Time after Bleeding.

213. I. If a Ligature be made round the Neck, or any Degree of Preſſure is applied to the *external Jugular*, ſo as to obſtruct the Deſcent of the Blood through them, the Reſiſtance will be immediately communicated to the *external carotid Arteries*, which are conjoined to theſe Veins: Hence, the Circulation of the Blood being, as it were, ſtopped in the external *Carotids*, the *internal* Branches thereof, which go to the Brain, will have a larger Share of Blood propelled into them, than before this Impediment was made in the *external Jugulars*; and what ſad Conſequences this may produce, when the *Arteriolæ* in the Brain are, perhaps, already obſtructed, and diſtended to their utmoſt Stretch, is eaſy to gueſs at.

214. If it be objected, that this Obſtruction to the Deſcent of the Blood through the Jugulars, does not laſt long, but immediately ceaſes upon opening the Vein; I anſwer, that unleſs the *Surgeon* be expert, and has been much uſed to this Operation, it is oftentimes longer before he opens the Vein, after the Ligature or Preſſure is made, than *ten* or *twelve* Ounces of Blood is flowing out of the Orifice; eſpecially if it be made large, as it ought to be.

215. But, however, let the increaſed Impetus of the Blood, on the obſtructed *Arteriolæ* of the Brain, remain ever ſo ſhort a Time, yet if the obſtructing Matter be ſo viſcous and tough, or the obſtructed Veſſels have ſo far loſt their contractile Power, that the *Impedimenta* will not give Way; it muſt neceſſarily follow, that more violent Impulſe will greatly endanger burſting the obſtructed capillary, ſanguine, and lymphatic Arteries, or rivetting the Obſtructions, and rendering them more obſtinate. I know that many Surgeons do open the Jugular in an Inſtant, and without making a Ligature round the Neck; but I am ſure I have ſometimes ſeen the Sick almoſt ſtrangled before the Operation hath been performed: And where it requires ſo much Time in bringing about, I am very apprehenſive of the Miſchief that may follow.

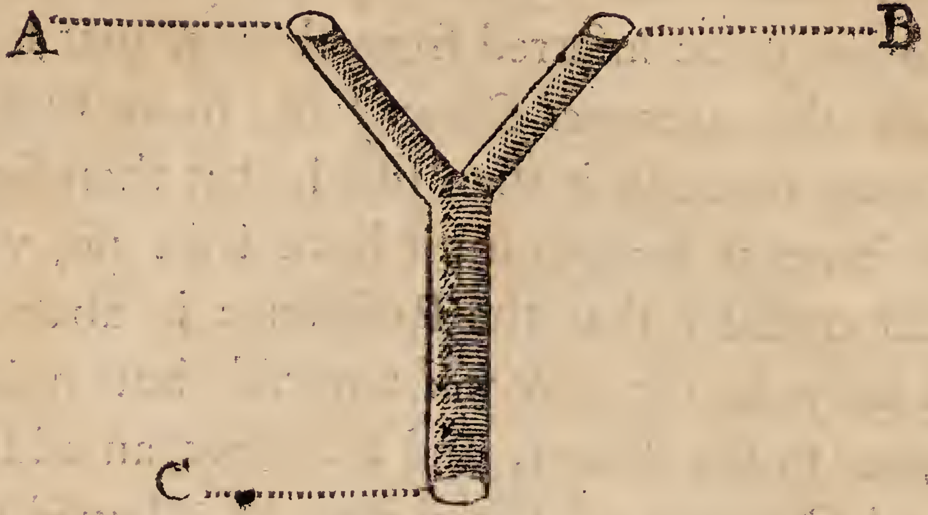
216. II. As ſoon as the *external Jugular* is opened, it is manifeſt the Blood will flow out of the Orifice with little Reſiſtance, in Compariſon to what it met with before, from the precedent Blood, and from the Friction againſt the Sides of a longer Tube: For the taking away the *Impedimentum* from one Side, is equivalent to the adding an

equal *Momentum* on the other. Hence, a greater Quantity of Blood will flow out of the *external Jugular*, when a large Orifice is made in it, than would have circulated through it before in the ſame given Time; and the Reſiſtance being diminiſhed in the *external Jugular*, the ſame will alſo happen in the *external Carotid*, and from thence even to the Heart itſelf; it being evident that one great Reſiſtance to the Motion of the Blood, at the Heart, or in the Arteries, is the precedent Blood, which always hinders the ſucceeding, ſeeing before the one ſucceeds in it's Place, the other muſt be removed: And this Reſiſtance is always proportional to the Quantity of Blood.

217. Now the Heart continuing to contract with it's uſual Force, and the *Impedimentum* being abated in the *Aorta aſcendens*, becauſe one of it's principal Branches is cut, it will of courſe propel the Blood moſt freely towards the *carotid Artery*, where the Volume of the Blood is ſhortened, and the Friction is made leſs. Hence, the Velocity of the Blood will be augmented from the Heart to the Orifice in the jugular Vein; and from thence a greater Quantity of Blood will be derived into the *external Carotid*,

whilſt the *external Jugular* is open, than there was before it was opened. But then it is not to be inferred from thence, that becauſe the *external Carotid* has more Blood flowing through it than uſual, that therefore the *internal* Branch muſt have leſs; no, we muſt conſider that the Reſiſtance is abated, not only in the *external Carotid*, but quite down to the *Heart*, and therefore an additional Quantity of Blood may be allowed to the *external Carotid*, and yet the *internal* ſhall have as large a Share, if not more, than before. For if we grant that *Bleeding* in the *external Jugular* increaſes the Velocity of the Blood in the *Aorta aſcendens*, it is more than probable, that all it's Branches are more generouſly ſupplied with Blood.

218. But that we may illuſtrate this in the moſt eaſy Manner, give me Leave to repreſent the *carotid Artery*, both before and after it's Diviſion, by the following Figure.



A. The *external* Branch of the *carotid Artery*, which ſupplies the external Parts of the *Head*, *Face*, &c. with Blood; and whoſe Extremities are conjoined with thoſe of the *external jugular Vein.*

B. The *internal* Branch of the *Carotid*, which goes to the *Brain.*

C. The main Stem of the *carotid Artery* before it's Diviſion.

219. Hence it will appear that if the external *Jugular*, which is conjoined to A, be opened, the Blood will circulate more freely through A, than it did before; but then we muſt not immediately conclude that the Blood which is added to A, is taken away from B, becauſe the Reſiſtance is alſo abated

in C; and conſequently as long as a larger Quantity of Blood is derived to C, a greater Quantity may be allowed to A, without diminiſhing that which flows to B.

220. The *Doctor's* Argument would undoubtedly hold good, was there ſuch a given Quantity of Blood to flow through the *Carotid Artery* in a given Time, and never no more; for then the taking away more Blood than uſual from one of it's Branches, would diminiſh the Quantity in the other. But ſince the Velocity of the Blood is always in Proportion to the Impulſe it receives from the Heart, and the Reſiſtance it meets with in the Veſſels; it follows, that the ſame impelling Force will be capable of circulating much more Blood through the *Carotid Artery*, in the ſame Space of Time, when the Reſiſtance from the precedent Blood is diminiſhed, as above mentioned; and conſequently, both the internal and external Branches may receive a larger Quantity of Blood than they did before.

221. III. When the Orifice in the *Jugular Vein* is cloſed up, the Blood immediately takes to it's old Courſe again, and in ſome little Time the Reſiſtance in the *external Carotid* becomes equal to that in the *internal*,

ternal, and yet there are ſeveral Reaſons to believe that the Velocity of the Blood continues to be greater in the *aſcending* than in the *deſcending Trunk* of the *Aorta,* for ſome Time after Bleeding; and if ſo, then the *internal Carotid* muſt neceſſarily have more Blood propelled into it, than there was before the Operation was performed.

222. The common Practice of *Bleeding* in the *Foot,* in order to provoke the *Menſium Fluxus,* is a very ſtrong Argument in favour of what has been ſaid; for when the *Vena Saphæna* is cut, it is not done with an Intent of deriving a greater Quantity of Blood into the *Crural Artery* only, but alſo into the *Hypogaſtrics,* which ſupply the *Uterus, Vagina,* &c. with Blood: And this comes to paſs by abating the Reſiſtance to the Blood's Motion in the whole *deſcending Trunk,* ſo that all it's Veſſels are more plentifully ſtored with Blood.

223. The Succeſs of this Operation is every Day confirmed; and if *Bleeding* in the *Foot* will draw a greater Flux of Blood into the Veſſels of the *Uterus,* &c. I think we have all the Reaſon in the World to conclude, that *Bleeding in the Jugular* will like-

wiſe derive a greater Quantity of Blood into the Veſſels of the Brain.

224. I am ſenſible that *Bleeding in the Jugular* has been oftentimes ſucceſsfully practiſed in a *Phrenſy* which followed upon a *Fever*, and even in *Maniacs* when all other Methods have failed; but then I have obſerved, it has not been ſo in the *firſt Stage* of the Diſtemper, not till other plentiful Evacuations have preceded it. And in the very Caſe of Lieutenant *Pool*, which Dr. *Friend* * Inſtances, as a remarkable Recovery from a *Phrenſy* by bleeding in the Jugular, it appears that the

1. Day, Twelve Ounces of Blood were taken from the Arm.

2. A Vomit was given, by which he alſo had a Stool.

3. A Veſicatory was applied to the Neck.

4. Large Bliſters were applied to each Arm.

5. He was blooded in the Jugular.

6. A Clyſter was injected, and a Veſicatory applied to the Head.

7. Another Clyſter was injected.

8. Veſicatories were applied to both Thighs.

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* Vide *Comment.* II.

9. No Evacuation was made.

10. Twelve Ounces of Blood were again taken from the Jugular. From which Time his *Delirium* almoſt wholly went off on a ſudden, and the other Signs were gradually changed for the better; ſo that at the laſt he perfectly recovered.

225. Now ſetting aſide the Structure of the Parts, I am humbly of Opinion, there is more Reaſon to attribute this Succeſs from Bleeding in the Jugular, to *Derivation* than to *Revulſion*; for after ſo many Evacuations, and the Uſe of only temperate Medicines, it may reaſonably be ſuppoſed that the Fibres began to flag, and the animal Spirits muſt be prodigiouſly waſted by the *Tenth* Day of ſuch a Fever. Indeed, if we obſerve the Doctor's Expreſſion, *viz. his Pulſe was ſtill pretty ſtrong*; it ſeems to imply that he began to ſink: And if ſo, the obſtructed *Arteriolæ* in the Brain, ſtood in need of a freſh *Impetus* to break through and diſlodge the *Lentor*; which was no ſooner done, by *Bleeding in the Jugular*, but his Senſes returned, and he gradually recovered.

226. If we reflect on the *ſpontaneous Eruptions* of Blood from the *Noſe*, which frequently happen in Fevers, and by which the

Diſeaſed are often healed, as Dr. *Friend* obſerves from *Hippocrates*, it will appear that this Evacuation is moſt likely to come from a Branch of the *internal Carotid.* Dr. *Keil** tells us, *The Veſſels of the Noſe are Arteries from the Carotidals which paſs with the olfactory Nerves; they are diſtributed in the internal Noſe: The external Carotidal and Jugular, give Arteries and Veins to the external Noſe.* And Mr. *Cheſelden* † obſerves, *That the internal Carotids ſend two Branches to the back Part of the Noſe.*

227. Now, ſince it is commonly obſerved that a *ſpontaneous Hæmorrhage* from the *Noſe* does not relieve the *Head* ſo much in the *Beginning* of a Fever, as when it happens towards the *ſtationary Period;* I think it is plain, that in a *Phrenſy* which follows upon a *Fever,* the ſafeſt Practice is to begin with *Revellents;* and this is moſt effectually performed by *Bleeding* in the *Foot,* and not in the *Jugular.* In ſhort, from what has been ſaid, it evidently appears, that whatever Diſorder in the *Head* is relieved by *Bleeding* in the Jugular, the Succeſs is owing to *Derivation,* and not to *Revulſion.* Q. E. D.

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* Vide *Anatomy.*

† Vide *Anatomy.*

228. The Importance of this Subject is ſo great, that I hope the *Reader* will not think I have been too prolix upon it. Proceed we now to other Matters, relating to the Cure of this Diſeaſe.

229. Proper Evacuation being made by *Bleeding*, we are, in the next Place, to have regard to the Viſcidity, Glutinouſneſs, or *Lentor* in the Blood and Lymph; which obſtructing the free Courſe of the Circulation through the capillary, ſanguine, and lymphatic Arteries, accumulates the Blood and Lymph in the more pervious and patent Tubes, and increaſes the Motion, Heat, Inſpiſſation, and Acridneſs of the Juices.

230. It muſt therefore be our chief Care to dilute, and concoct all viſcous ſizy Humours; to attenuate thoſe, whoſe Parts are too bulky to paſs freely through the decreaſing Series of Veſſels; and to correct, abſorb, and alter all ſaline, ſulphureous, bilious Particles, which are now become much more angular, acrid, and pungent than in a healthful State.

231. The Concoction of the febrile Matter is no more than a preparatory Alteration of it for a convenient and ſalutary Diſcharge, either by *Sweat*, *Urine*, *Stool*, &c. Or when a Portion of peccant Matter is brought to

Coction, it has acquired ſuch a Diſpoſition, as makes it fit to be ſeparated from the ſounder Parts of the ſanguineous Maſs, or from the *Tubuli* to which it adhered, and to be afterwards expelled the Body. That is, the viſcous, obſtructing, febrile Matter is diluted, diſſolved, attenuated, and ground fine enough to paſs the minuteſt, and remoteſt *Tubuli* without Stagnation, or Obſtruction.

232. Now, whatever is able to attenuate or diſſolve groſs, viſcid Matter in the animal Fluids, or adhering to the Sides of the Veſſels, muſt affect it either by forcibly ſtriking into, and cleaving it aſunder, or elſe by gently inſinuating itſelf into it's Pores, and attracting it's conſtituent Particles, ſo as to make them recede from one another, and embrace thoſe of the *Diſſolvent*. The *former* is the Work of *ponderous* and *pointed* Medicines, which increaſe the Velocity and *Momentum* of the Blood, and Strength, and Stiffneſs to the Veſſels, and conſequently rarefy and heat the whole Maſs of Blood to a great Degree. The *latter* is the Office of ſmooth, aqueous, demulcent Liquors, which being adapted to the Pores and Interſtices of the morbific Matter, inſinuate themſelves

between it's Corpuſcles, and by their ſtrongly attracting Power, divide, diſſolve, and dilute it.

233. Hence it is eaſy to apprehend which of theſe Sort of Medicines is moſt eligible in *burning Fevers*; *viz.* ſuch as by their Weight, Volatility, Reſtringency, or Stypticity increaſe the Motion and Heat of the Blood, and render the ſeveral Series of Veſſels more rigid and tenſe; or ſuch as thin, cool, and check the impetuous Motion of the Blood, moiſten the dry, parched Fibres, and promote a free Paſſage for the Blood through the capillary, ſanguine, and lymphatic Arteries.

234. Thoſe Medicines, therefore, which dilute the Blood, thin the Humours, ſeparate and diſſolve the Viſcoſities without increaſing the Heat of the Body, are the Things indicated in this Diſeaſe; and theſe are univerſally allowed to be performed moſt ſafely by a liberal Uſe of ſome ſmooth, cooling, diluting, abſterſive Liquors.

235. But before we point out the moſt proper of theſe Sort of Medicines, I would obſerve, that if the Patient has ſick Fits with Vomitings, and upon Inquiry you find he has eaten or drank any Thing diſagreeable,

able, or if a deal of bilious, pituitous Matter is brought up; it will be proper, firſt of all to exhibit a gentle *Emetic*, after a ſufficient Quantity of Blood has been drawn off, in Proportion to the Strength of the Body and Violence of the Diſeaſe.

236. What Advantages may be reaped from *Vomiting* in the *Beginning of acute Fevers*, will eaſily appear from the ſubſequent Reaſoning:

I. It diſcharges any bilious, pituitous, or indigeſted Matter which might otherwiſe lie in the Stomach, and fret it into frequent Motions to vomit; and which, if it was not thrown off, would putrefy, corrupt, and grow acrid, and corroſive: Whence oftentimes ariſe dangerous *Diarrhœas*, towards the Height of the Fever, for want of vomiting in the Beginning.

II. It opens the ſecretory and excretory Ducts of the Glands of the *Fauces*, *Oeſophagus*, *Stomach*, *Inteſtines*, *Spleen*, *Liver*, *Pancreas*, *Omentum*, and *Meſentery*; and unloads them of a great Quantity of viſcous Phlegm, and bilious Matter.

III. By the forcible Contractions of the Muſcles in Vomiting, they ſhake, agitate, divide, and attenuate the *Lentor*, and thereby

promote

promote the Secretions and Excretions, as is evident from the profuſe Sweats which always break out after plentiful Fits of vomiting.

237. *Sydenham* (who juſtly deſerved the following *Encomium*, *viz.* *Artis noſtræ Ornator & Ornamentum; qui ſepoſitis Opinionum Commentis ad Obſervationes prorſus ſe dedit, & à prima Ætate ad extremum uſque Senium cum Naturâ cohabitavit)* had ſo great a Notion of vomiting in Fevers, that when he was called in late, and the Patient had not been vomited before, he did not ſcruple to give one at any Time of the Diſeaſe, if the Patient had Strength to bear the working of it. He tells us, he often gave one on the *twelfth* Day of the Fever, though the Sick had left off vomiting before, and ſo ſtopped a Looſeneſs which prevented the Fever's coming to a *Criſis*.

238. In ſuch a Caſe, indeed, where a *Symptomatical* Looſeneſs hinders a *Criſis*, no Medicines more powerfully revel the Humours, than thoſe which excite vomiting; and, therefore, upon ſuch an Account, they may be ſalutary at any Time of the Diſeaſe: But when the *Criſis* is at Hand, and Nature is juſt ready to throw off the morbific Mat-

ter through ſome of the excretory Ducts, moſt *practical Writers* * forbid the Uſe of *Emetics*, becauſe they are endued with ſo ſtrong a Power of revelling, and by that Means they may diſturb that Method of Relief which *Nature*, the beſt Guide in Practice, attempts.

239. When, therefore, the Fever is far advanced, and there is no Looſeneſs or other Symptom which immediately requires vomiting, it may be the moſt ſecure Way to let it alone; becauſe when the Heat is moſt intenſe, and the Blood and Lymph inſpiſſated by the Heat, the Agitations and Concuſſions, excited in the Fibres, in Fits of vomiting, may poſſibly augment the Heat, and aggravate the bad Symptoms: But in the *Beginning* of Fevers, before the Humours are boiled up into a Size, and before any Obſtructions are firmly fixed in the *Viſcera*, nothing bids fairer to clear the *primæ Viæ*, and to promote the Secretions and Excretions, than a gentle *Emetic*.

240. The *Liquors* moſt approved of in *acute, ardent Fevers*, are the following, *viz.*

I. *Barley Water*, which by the Slipperineſs of it's Parts, and it's Freedom from Viſcidity and Tenacity, is a fit Vehicle to dilute groſs, ſizy Humours, to divide the more firm, earthy, or ſaline Parts of the Blood, and to abate the Heat thereof; for as it leaves no *Stimulus* behind it, it will contribute greatly towards relaxing the too tenſe and contracted Veſſels; and the more watery a Body is, the leſs ſuſceptible it is of Heat. * We have good Reaſon to believe, that if pure Water were to paſs through the Blood-Veſſels, with a Velocity equal to that of the Blood, yet it would thereby acquire no Heat. Hence it appears that the more we dilute and divide the red Globules of the Blood, and prevent their Friction, by watery Drinks, the more we cool the Body.

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* Vide *Friend's Comment. on Fevers.*

II. Where the active, ſaline, and ſulphureous Particles, abound too much in the animal Fluids, we muſt make uſe of Liquors conſiſting of the moſt paſſive Principles; upon which account it is, that *thin, clear Whey, Water-Gruel, Teas* made of *Sage, Balm, Elder-Flowers,* &c. are ſo ſerviceable. *Water* is the chief Principle to be depended upon; but the other Ingredients ſerve to render it more ſlippery, abſterſive and agreeable. There is no real Diluent but Water; every Fluid is diluent as it contains Water in it. Water dilutes the Blood and Humours, and at the ſame Time relaxes the Fibres: Whence, as long as there is *Thirſt, a quick Pulſe, Drineſs and Stricture of the Veſſels,* ſo long are ſmooth, watery Drinks ſafely exhibited. An emollient Drink of *Mallow-Leaves,* or *Roots,* a few *Figs,* and ſome *Raiſons of the Sun,* may be fitly uſed to promote Dilution and Excretion.

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* Vide *Hale's Statical Eſſays*, Vol. II.

III. When the Heat is extreme, and the other Symptoms demonſtrate that the Humours are tending towards an acrid, alkaline Diſpoſition, the above-mentioned Drinks ſhould be acidulated with *Vinegar,* or the *Juice of Oranges* or *Lemons;* or they ſhould be ſuch whoſe Natures are *aceſcent.* In this Caſe nothing appears to be more cooling than *Currants, two Ounces* of their *Jelly,* diſſolved in a Quart of warm Water, makes the moſt agreeable, ſharp, aceſcent Drink in the World; it quenches Thirſt, checks the too great Velocity and Rarefaction of the Blood, abates the Redundancy and Acrimony of the Bile; by it's acid Salts, it prevents the Humours from altering to an alkaline State, it is of a delicious Taſte, and ſcarce ever palls the Stomach. A Decoction of *Stone-Pippins*; an Infuſion of *Wood-Sorrel*, *Lemonade*, and *roaſted Apples* diſſolved in Water, are all of the ſame Nature, and exceedingly refreſhing and cooling.

IV. *Clear*, *old Small-Beer*, neither bitter nor ſour, will agree very well with thoſe who have no *Nauſea*, *Sickneſs at Stomach*, nor *Tendency to a Looſeneſs*. Where the Symptoms are moderate, and where the Blood is not too much rarefied, to deny *Small Beer*, to be taken now and then moderately, is a needleſs Severity, and very often hurtful, eſpecially where it has always been uſed as the common Diluter of the Food. But in others, whoſe vital Powers are wound up to their higheſt Pitch, and whoſe Blood is in vaſt Agitation, *Small-Beer* will not agree; becauſe, however ſmall, it contains a Portion of Spirit, which, by it's Briſkneſs, will irritate the *Fibrillæ* into more frequent and ſtrong Contractions; and as it contains a deal of very elaſtic Air, it is ever ready to ferment, by which Means it will cauſe ſtill greater Tumults in the Blood, and render the Patient delirious, if not ſo before.

V. If the Body be coſtive, an *Ounce* of *Tamarinds* boiled in a Quart of Barley-Water,

ter, makes a very agreeable, delightful Liquor.

241. Hence all theſe Sorts of Drinks produce wonderful, beneficial Effects, by mixing with, diluting, attenuating, and diſſolving the Groſſneſs and Coheſion of the Blood and *Moleculæ,* which foul the Glands, furr the Channels, and beget Obſtructions in the minute, delicate *Tubuli* of the Body. They alſo ſheath, diſſolve, and break the ſharp *Spiculæ* of the acrid, alkaline Salts, and promote and haſten their Diſcharge through ſome of the Emunctories. And *laſtly*, by their Smoothneſs and Slipperineſs they ſupple, relax, and take off the too great Tenſion and Stiffneſs of the Fibres; upon all which Accounts they are excellently good.

242. *Hippocrates* *, from long Experience, has recommended to us ſeveral Kinds of Aliment proper in *ardent Fevers, viz. The intire Ptiſan, the Cream of Ptiſan, and Hydromel*; all which are well adapted to the Cure of Fevers, by Reaſon they are light, ſmooth, cooling, and moderately abſterſive, without the leaſt Aſperity or Aſtringency, which is very injurious to Perſons in this

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* Vide Lib. de *Diæta in Morbis acutis.*

Diſtemper: Hence thoſe Perſons who firſt introduced among us the temperate and diluting Regimen, as it is called, gathered it almoſt wholly from *Hippocrates*; and without doubt this Method of Cure is not only moſt ſafe, but of the greateſt Service.

243. But as the beſt Remedies may be falſly applied, or their Virtues deſtroyed by being adminiſtered in too large or too ſmall Doſes, ſo it has happened here: Some few, unſkilful, unexperienced People obſerving the great Benefits which accrued from a moderate Uſe of watery Liquors, in the *Beginning* of Fevers, falſly concluded from thence, that if *two, three, four or five Pints of cold Water* were to be drank all at once, or in a very little Time, it would haſten Concoction, promote a Criſis, and cure the Sick immediately. Whereas Experience aſſures us, the ſwallowing down an unreaſonable Quantity of Drink, in the *Beginning* of Fevers, is oftentimes attended with fatal Conſequences; for the *perſpirable Ducts* being too tenſe and contracted, or bunged up with Matter too viſcous and tough to give Way as yet, and the *urinary Paſſages* being too ſtrict to be dilated or diſtended in Proportion to the Deluge, they will ſtrain it off

but ſparingly; ſo that a general Fulneſs will ariſe, with *Sickneſs at Stomach, Deliria, Coma*, &c. and the Diſeaſe will be prolonged, as well as rendered more dangerous.

244. *Hippocrates*, *Lib. de Arte*, tells us, whatſoever is beneficial, proves ſuch by Virtue of the right Uſe and Application: For the innumerable unlucky Accidents that fall out, are owing not ſo much to any ill Quality in the Remedy, as to falſe Indication, or the Defect of Cautions and Precepts relating to the Uſe of it. Agreeable to which is the Caſe before us; our chief Dependance, in the *Cure of ardent Fevers*, is upon ſmooth watery, abſterſive Drinks, to diſſolve and dilute the acrid, alkaline Salts, abounding in the Blood, and to waſte, and waſh away all viſcous, glutinous Matter adhering to the Sides of the capillary Veſſels, and obſtructing the free Courſe of the Circulation. But as this cannot be done all at once, no more than we can remove Mountains, and as a violent Diſtenſion of the Veſſels, and an increaſed Impetus of the Blood, from drinking too large Quantities of Liquors, would greatly endanger burſting the capillary, ſanguine, and lymphatic Arteries, producing Inflammations, and a whole Train of de-

ſperate Symptoms; it evidently follows, that the ſafeſt Practice is to uſe them moderately in the *Beginning* of this Diſeaſe, and towards the *Height*, or *ſtationary Period*, when the ſeveral *Phænomena* aſſure us that the morbid Matter is ſufficiently attenuated, divided, and looſened, that it only wants an additional Impulſe to dilate the Veſſels, and caſt it forth through ſome of the excretory Ducts; we may be more liberal, and allow our Patients Drink in larger Quantities.

245. I have ſometimes diſputed with myſelf whether it was moſt eligible to indulge my Patients in drinking any of the abovementioned Liquors, quite cold; ſince the Deſire of the Perſon, the extreme Heat, Thirſt, parched Tongue, Throat, &c. ſeemed always to require it, and ſince the Coldneſs of the Liquor would alſo help to condenſe the rarefied Blood, and act in Oppoſition to the intenſe Heat of the Humours: But then, on the contrary, maturely conſidering the Danger that might ariſe from the *Stimulus* which would immediately be given to the *Mouth, Throat, and Stomach,* by large Draughts of cold Liquors; that this might probably conſtipate the excretory Ducts of the ſeveral Glands belonging to thoſe Parts,

and thereby increaſe rather than abate the Drought and Thirſt ſo much complained of; and *laſtly*, ſince the *Stomach* is moſt plentifully ſtored with Blood-Veſſels, and is ſurrounded by the *Liver*, *Spleen*, *Aorta, deſcendens*, &c. extreme cold Liquors might condenſe and incraſſate the Blood, and ſuddenly contract the capillary Veſſels, ſo that only the fineſt and thinneſt Parts would paſs through them, whilſt the groſs are obſtructed, fixed, and wedged in: Whence *Obſtructions*, *Inflammations*, *Mortifications*, &c. I ſay, conſidering the Riſque we might run in theſe Things, I, for my Part, always chuſe to let the Drink be a little warmed, and believe it anſwers the End much the beſt, both as a Diluter, and Slaker of Thirſt, by Reaſon it keeps the Veſſel more pliable and lax, and thereby procures a freer Courſe for the Fluids to paſs without Lett or Stoppage.

246. It is well known that *Heat* and *Cold* greatly dilate and contract our Veſſels. Dr. *Hales* * has demonſtrated by many curious Experiments, that the Veſſels of an animal Body are manifeſtly contracted or relaxed, by different Degrees of Heat, or

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* Vide *Statical Eſſays*, Vol. II.

Cold. He hath ſhewn us that cold Water is much longer in paſſing the Minute, capillary Arteries, than when it is Blood-warm; and though it is not to be imagined that the Effects are ſo ſudden and great in live Animals, as in thoſe Experiments which he made; becauſe in living Bodies, the ſeveral Fluids which are taken in, are more gradually, and in ſmaller Quantities imbibed and blended with the Blood; yet if we conſider the eaſy Paſſage of ſo diluted a Fluid, as Water, from the *Stomach* and *Guts* immediately into the *meſeraic Veins*, and the great Velocity of the Blood in circulating, it will appear that very cold Liquors, drank in large Quantities, may do much Miſchief, by conſtringing the Veſſels, and increaſing the Force of the arterial Blood.

247. Some, indeed, there are, who are bold enough to render cold Water to be drank in large Quantities, through the whole Courſe of a Fever; but if we will hearken to the Advice of a very learned and ingenious *Author* *, he aſſures us, that thoſe Things are more ſafe, which, beſides their effectually cooling, help towards concocting the Matter, by their inciding and abſterſive

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* Vide *Lemmius, of the Cure of Fevers.*

Faculties, both which are wanting in cold Water. Beſides, ſays he, drinking cold Water through the whole Courſe of the Diſeaſe, not only obſtructs the Maturation of the Matter, but becomes ſo familiar to Nature, that it acts with much leſs Efficacy in the Height of the Diſtemper, when it ought to be liberally drank, that it may impel the Humours to Excretion.

248. As to *Food* of any Kind, the Sick, as hath been obſerved above, are generally averſe to it, and take it with Reluctance; for ſince Nature is wholly engaged in ſubduing, attenuating, dividing, and concocting the morbid Matter, it muſt conſequently be very injurious to intrude upon her a viſcid Chyle, which will require a great Share of Strength to aſſimilate, or otherwiſe it will increaſe the *Lentor*, and aggravate all the Complaints.

249. But if the Patient ſhould ſeem to crave for ſomething to eat, as it ſometimes happens, ſmooth *Water-Gruel*, *Panado*, or *Barley* boiled to a Softneſs, and pulped, and ſweetened to the Taſte, are the only Things to be allowed of.

250. Having now ſhewn the great Advantages of *Bleeding*, *Vomiting*, and *Dilu-*

tion in the *Beginning* of this Diſtemper, I ſhall here take an Opportunity of pointing out ſome very deſtructive Medicines, though too commonly made uſe of in the Beginning of *acute Fevers*; and then proceed to direct you to thoſe which long Experience, and a continual Series of Obſervations, have eſtabliſhed their Reputation, and proved their Uſefulneſs.

251. *Firſt* then, we muſt by no Means venture to exhibit ſtrong *Diaphoretics* or *Alexipharmics*, ſuch as the *Theriaca & Mithridatium, Rad. Serpent. Virg. Antim. Diaphoret. Crocus, Coccinel. Camphor. Sal. Vol. Succin. Corn. Cervi, Aq. Epidem. Pæoniæ, Theriacalis*, &c. This Cuſtom, as it is exceedingly common with thoſe who are intirely ignorant of the *Laws and Motions of the animal Oeconomy*, ſo it is likewiſe extremely dangerous; for ſeeing ſuch Medicaments as theſe, do rarefy the Blood, and increaſe it's Motion, inſtead of cooling and abating it's Velocity, they muſt neceſſarily weaken the vital Powers, by giving too great Reſiſtance, and ſtraining the animal Springs beyond what they are able to bear.

252. Where the innate Warmth is wanting the *Vis Vitæ* decayed, and the native

Force weakened, theſe Sort of Medicines are of admirable Uſe; but in *acute Caſes*, where the motive Powers, and vital Heat are raiſed much too high; where the oily and ſaline Principles of the Blood are already too much attenuated, or raiſed to a great Degree of Volatility; and where Blood and Lymph are already too viſcid and glutinous, through extreme Heat; ſuch Medicines muſt needs be quite contrary to the *curative Indications*, and will certainly prove deſtructive, by adding to the Attrition of the Globules, and rendering the Blood more acrimonious, rancid, and alkaline: In conſequence of which, the whole ſanguineous Maſs may be reduced to a State of Putrefaction, capable of producing *Pains, extreme Thirſt, Inquietude, Watchings, Deliria, Diſtenſion of the Nerves, Hiccough, and other deadly Symptoms.*

253. The *Author* * of the *Diſcouſe concerning Fevers*, is of opinion, that the *Theriaca* and *Mithridatium* are ſo far from deſerving the Title of *Alexipharmics* in acute, inflammatory Fevers, that they may rather be termed *Pharmaca*, as implying, in the worſt Senſe of the Word, *Poiſons*; and which, I am

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* *Dr. Turner.*

afraid, ſays he, through their indiſcriminate Uſe, have carried off more People than all the Plagues we ever had in *England.* And again, do we not generally find that all theſe haſty Sweats are ſymptomatical, ſeldom leſſening the *Fomes* of the Diſeaſe, but increaſing the ſame? Or what do we do hereby, but quicken the Motion and Heat of the Blood, and excite thereby *Coma*, *Vigil*, &c.

254. The learned *Willis* obſerves, that Medicines which too much exagitate the Blood, are to be ſhunned in a Fever, with the ſame Induſtry, as Blaſts of Wind to burning Houſes. And, indeed, if we conſider the Mechaniſm of the Body, the Nature of the Diſeaſe, and the Properties of Medicines, we ſhall ſoon find it abſolutely impoſſible for hot, acrid, ſpirituous, volatile Medicines to be of any ſervice in the *Beginning* and *Increment* of this Diſeaſe; and ſeldom or never in the *Height*, unleſs the vital Powers begin to flag, and the Strength of the Body is not ſufficient to bring on a *Criſis* without ſuch Helps.

255. If Sweating could be raiſed without exagitating the Blood, and increaſing it's Heat, it would neceſſarily diminiſh the Quantity of Lymph, and conſequently leave

the Blood and Humours proportionably more thick and viſcous; but ſince the ſecretory and excretory Ducts of the *Glandulæ miliares* are either too tenſe and contracted, or the Lymph is too viſcid and glutinous to be ſecerned, *Sudorifics* ſeldom anſwer the Intention, in the *Beginning* of Fevers, but augment the Complaints by increaſing the Motion, Heat, and Inſpiſſation of the Blood.

256. *Secondly*, There is another Madneſs alſo different from this *, which ſome are poſſeſſed with, who rely wholly upon *Acids* for a Cure; and place all their Hopes upon *Vinegar* and the *Juice of wild Apples:* As if becauſe it is unreaſonable to burn up the Patient, they ſhould therefore quite kill him with Cold. It is not meant by this that *Acids* are always improper, and therefore to be condemned by the Lump; but, on the contrary, when the Heat is vaſtly intenſe, when the *Salts* of the Blood are volatilized, and rendered as acrid as poſſible, and the *Oils* are diſſolved, attenuated, and exalted, ſo as to become extremely pungent, and when the ſeveral Humours of the Body tend towards Putrefaction; *Vinegar*, or ſome other *Acid*, moderately adminiſtered, and

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* Vide *Friend's Comment. on Fevers.*

ſufficiently diluted, may be exceedingly proper: For *Vinegar* * is an acid, volatile, penetrating, unctious Liquor, that makes an Effervescence with Alkalies, cools the human Body, prevents the Effects of Drunkenneſs therein, and prevents all manner of Putrefaction and Corruption. It is not of a coagulating Nature, like all other Acids, but attenuates, incides, and reſolves Obſtructions.

257. Hence many excellent Authors recommend the Uſe thereof in ſeveral acute Caſes, as particularly in the *Pleuriſy*, *Peripneumony*, *Small-Pox*, *Plague*, and *burning Fevers*; where the Blood and Humours are too thick and viſcid, or where the ſeveral Juices tend towards Putrefaction. And therefore all that we mean by this Caution is, not to depend intirely upon *Acids*, or to exhibit them in too large Doſes, or to miſtake the Nature of other Acids, from what has been ſaid concerning *Vinegar*.

258. *Thirdly*, All *Narcotics* or *Soporifics*, of which *Opium*, and it's ſeveral Preparations are the chief, are deſtructive Medicines in the *Beginning* of this Diſeaſe; there being no one Drug yet known, which in ſo ſmall a Quantity, affects the Brain and Nerves like

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* Vide *Boerhaave's Chemiſtry.*

Opium. This is what I adviſe all *young Practitioners* to avoid giving their Patients, in the *Beginning* or *Increaſe* of *ardent Fevers*, let them be never ſo reſtleſs and uneaſy; becauſe the Membranes, and nervous *Fibrillæ* of the Brain, are, at ſuch Times, too tenſe and contracted to give Way to a Relaxation neceſſary for Sleep; ſo that inſtead of Reſt, the Sick will be delirious and frantic. I have known ſeveral Perſons die raving mad, by the unſkilful Adminiſtration of an *Opiate*, in acute Diſorders. *Sydenham* ſays, he once ordered it on the *twelfth* Day of this Diſeaſe to good Purpoſe, but he never knew it uſed ſooner with any Succeſs; but if it be deferred to the *fourteenth* Day, it will ſucceed better, Separation then being more perfect: And indeed if the Patient be purged before the taking the Anodyne, it will prove more effectual.

259. *Fourthly*, I have known ſome raw and unexperienced *Practitioners* endeavour to repreſs the *bilious Vomitings*, which commonly happen in the Beginning of this Diſeaſe, with *Salt of Wormwood Draughts*; whereby they have precipitated the Deſtruction of their Patients. For, not to mention the great Benefit *Nature* aims at in

ejecting ſo much acrid, ſharp, irritating Matter, which, if abſorbed, or imbibed, into the Blood, would vaſtly augment the Fever; the *Salt of Wormwood*, being a cauſtic, and firey Salt, is exceedingly improper at ſuch Times. All *alkaline Salts* are dangerous Medicines in this Diſeaſe; for, as they have a Power of immediately rendering our native Salts of a ſharp pungent Nature, and acting upon them like ſo much volatile, alkaline Salt introduced into the Body *; thereby they turn our half-fixed Salts into ſuch as are truly volatile; thoſe that before were of a benign, gentle Nature, into ſuch as are firey; thoſe that were neutral and innocent, into ſuch as are corroſive, *&c.* On which account they act like Poiſon in all ſuch Diſtempers where the animal Salts and Oils are too much attenuated and exalted; as in *acute Fevers*, *inflammatory Caſes*, &c.

260. Hence many Men not duly attending to *Nature*'s Direction, or not knowing the Seat or Cauſe of the Diſtemper, attempt to eaſe the Symptoms inſtead of the Diſeaſe; and thereby oftentimes create new and unheard-of Diſorders. I lately met with an Inſtance of this Kind, where a *hale*, *luſty*,

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* Vide *Boerhaave*'s *Chemiſtry*.

young Man, in the full Vigour of his Age, being ſeized with an *acute continual Fever*, and inceſſant Vomitings of bilious Matter, had taken *two Drachms* of *Salt of Wormwood*, by the Direction of his *Apothecary*; the next Morning I found him raving mad, and notwithſtanding *Bleeding* thrice repeated, ſeveral Stools procured by *emollient Clyſters*, and *Veſicatories* applied to his *Back*, *Arms*, *Thighs*, and, *laſtly*, to his *Head*, the *Phrenſy*, *Diſtenſion of the Nerves*, *Subſultus Tendinum*, &c. continued till the tenth Day, on which he died.

261. *Fifthly*, Great Care likewiſe is to be taken not to apply *Bliſtering Plaiſters* too ſoon; that is, whilſt the Fibres are too rigid and ſtiff, the Heat very intenſe, and the Pulſe exceedingly full, ſtrong, and quick. This is a Caution to be obſerved, notwithſtanding the Head and Nerves ſhould be affected in the Beginning of this Diſtemper; for thoſe who are delirious with an acute Fever, and a parched Tongue, die quickly upon the Application of *Bliſtering Plaiſters* (ſays *Baglivi* *) and moſt of them are ſeized with Convulſions before they die. And beſides, there is nothing that follows the Ap-

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* Vide *de Uſu & Abuſu Veſicantium.*

plication of bliſtering Plaiſters ſo ſoon as Thirſt, with a Dryneſs of the Tongue; which, ſometimes, is ſo great, in Perſons not delirious, that nothing will pacify it but continual gargling with Water.

262. If we reflect on the Nature of *Cantharides*, how can we expect, in the *Beginning* of this Diſeaſe, any other Conſequences from the Uſe of them, whoſe Compoſition is chiefly of the moſt ſubtile, pungent, cauſtic, firey Particles? That they are ſmall enough to enter the *Vaſa inhalantia*, and paſs along with the refluent Blood, is evident from the *Diſury* ſo frequently complained of after the Application of bliſtering Plaiſters; and if the Particles of *Cantharides* continue to be ſo pungent and cauſtic after they are ſecreted and diluted with the Urine, as to ſtimulate and inflame the *urinary Paſſages*, what bad Effects may we not expect from them, when they paſs through the minute capillary Veſſels, which are already too tenſe and contracted? For, ſince the Coats of the capillary Veſſels bear a much greater Proportion to the contained, ſmall, cylindrical Fluid, than in larger *Tubuli*, the Properties or Qualities of any Medicament will pro-

duce more conſiderable Effects in the former than in the latter.

263. I am not unacquainted that the learned Dr. *Friend* * recommends *Veſicatories* in *ardent acute Fevers*, and ſays, " Any one " may very juſtly affirm, that more Perſons " have been freed from Fevers by this Me- " thod of Cure than by any other; nay, " ſays he, one may ſolemnly averr, that " more People have been recovered by this, " than by all the reſt." To which I intirely agree, when they are properly applied, towards the *ſtationary Period* of the Fever, when the *Solids* begin to flag, and ſtand in need of a *Stimulus*; or when the natural Operations are inſufficient to diſcharge the morbific Matter through the excretive Glandules without ſuch Aſſiſtances. But, on the contrary, whilſt the vital Powers are too ſtrong, whilſt the Veſſels and Fibres are too rigid and dry, whilſt the Blood and Lymph are viſcous and inſpiſſated merely by the Intenſeneſs of the Heat, and whilſt all the Efforts of Nature are ſufficiently ſtrong, the Application of bliſtering Plaiſters muſt needs be improper.

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* Vide *Comment. on Fevers.*

264. The great Uſe of bliſtering Plaiſters is where the Lymph abounds too much, and where the animal Veſſels are too lax and feeble: In ſuch a Caſe they do Service by diſcharging Part of the Lymph, and by exciting lively Motions, and briſk Vibrations or Oſcillations in the Fibres; whereby the Heat is augmented, the Pulſe are quickened, the Fluids are more intimately mixed, and the natural and healthy *Craſis* of the Blood is reſtored. Daily Experience aſſures us that the Elaſticity, Tenſion, and contractile Power of the Fibres are vaſtly increaſed by the Application of bliſtering Plaiſters; whence the conſtituent *Fibrillæ* of the *Membranes*, *Muſcles*, *Arteries*, *Veins*, *Nerves*, *Lymphatics*, &c. do contract more vigorouſly, and make more forcible Impreſſions upon the Fluids; the Fluids being propelled with greater Velocity than before, rebound upon the Solids; and by this mutual Action and Reaction, the ſanguineous Maſs is heated and inſpiſſated.

265. Hence it evidently appears, that in the *Beginning* of *ardent Fevers*, where the Blood is already too denſe and acrid, where the Velocity of the Circulation is too great, where the ſeveral Humours of the Body tend

towards an alkaline Acrimony, and where all the Eſſays of Nature are made with the greateſt Strength and Violence; here, I ſay, to ſcrew up the Tenſion and elaſtic Force of the Fibres to a greater Height, and to provoke them into more frequent and ſtronger Contractions, is only to increaſe the Complaints. Whoever wants further Proof of theſe Effects of *Cantharides*, let him conſult *Bellini de Stimulis*.

266. *Sixthly*, Innumerable Miſchiefs ariſe from keeping the Air of the Room of a feveriſh Perſon too hot *, by depriving the Patient of the Benefit of Refrigeration by cool Air: For there is great Uſe to be made of temperating feveriſh Heat by outward Air, ſo that it be done with Safety; that is, ſo as not to diſappoint the Intention of keeping up a due Quantity of Perſpiration. Nothing is more earneſtly deſired by the Patient than the breathing cool and freſh Air; and that the Blood is cooled by the Action of Inſpiration, is a Matter paſt doubt. Beſides, the ſulphureous, animal Steams, if they are pent up in the Room, will deſtroy the Elaſticity and vital Spirit of the Air; whence Reſpiration becomes difficult, a general Un-

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* Vide *Arbuthnot of Air.*

eaſineſs ariſes, the Sick throw off the Clothes, toſs about, and ſometimes get out of Bed in queſt of cool Air.

267. Dr. *Halley* * found by undoubted Experiment, that a Gallon of Air, included in a Bladder, and by a Pipe reciprocally inſpired and expired by the Lungs of a Man, will become unfit for any further Reſpiration, in little more than one Minute of Time; and though it's Elaſticity be but little altered, yet in paſſing the Lungs, it loſes it's vivifying Spirit, and is rendered effœte, and not unlike the *Medium* found in Damps, which is preſent Death to thoſe who Breathe in it; and which in an Inſtant extinguiſhes the brighteſt Flame, or the Shining of glowing Coals, or red-hot Iron, if put into it. By an Experiment alſo of Dr. *Hales* †, 74 cubical Inches of Air could not ſupply him half a Minute without Uneaſineſs, and not one Minute without Danger of Suffocation; but if he had been ſhut up with a proportional Quantity of Air, which conſequently muſt have been ſpoiled, not only by the Steams of the Lungs, but of the whole Body, the ſame Quantity would not have ſupplied

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* Vide *Phil. Tranſ.* N°. 349.

† Vide *Statical Eſſays*, Vol. II.

him ſo long a Time. Hence it is evident, that renewing and cooling the Air, or perflating the Patient's Room, is abſolutely neceſſary to ſupport the Spirits, to abate the Heat and Rarefaction of the Blood, and to prevent an alkaline Diſpoſition in the Humours.

268. *Seventhly, Heaping on too much Clothes,* under the Notion of incouraging Sweat, is a pernicious Cuſtom; becauſe it confines the Heat of the Body, and thereby increaſes it.

269. *Eighthly, Too little Covering,* eſpecially in the Winter Seaſon, may have as bad an Effect; for if cold Air has too free Acceſs to the Surface of the Body, it acts as a *Stimulus,* conſtipates the excretory Ducts of the miliary Glands, and condenſes the Fluids contained in them, into a greater State of Viſcidity: Whence a Sweat may be interrupted, which might otherwiſe have broke out.

270. Proceed we now to thoſe *Medicaments* which daily Experience teſtifies to be ſalutary and uſeful, in the *Beginning* and *Increment* of this Diſeaſe: But firſt of all give me leave to obſerve, that as a Fever is only an Effort of Nature, ariſing from the mere

Mechaniſm of the Body, to ſolve the Obſtructions, and caſt out of the Body whatever is offenſive to it; ſo whilſt the Symptoms are but moderate, there does not ſeem Occaſion for many Medicines; it being the Duty of a Phyſician to follow the Guidance of Nature, and not be too officious, leſt he ſhould interrupt her Proceedings inſtead of aſſiſting her.

271. *Hippocrates* * uſed but very few Remedies in the Cure of acute Fevers; for, abating a gentle *Vomit*, *Clyſters*, or the like in the *Beginning*, he depended chiefly upon cooling, diluting, abſterſive *Ptiſans*, variouſly contrived, according to the Genius of the Diſeaſe; and, leaving the reſt to *Nature*, expected a *Criſis* with Patience and Watchfulneſs.

272. *Sydenham*, that diligent Obſerver of Nature, aſſures us that when the Fermentation (that is, the Heat) was neither too high nor too low, he left it in that State, and uſed no Remedies, unleſs he was obliged to do Something by the Importunity of the Sick, or his Friends about him, that might pleaſe them without hindering his Deſign.

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* Vide *Lib. de Diæta in Morbis acutis.*

273. Hence the Phyſician is ſometimes under a neceſſity of preſcribing *Non-ſignificants* merely to preſerve his Character, and not be thought negligent or ignorant of the Cauſe of the Diſeaſe. The officious, buſy Tempers of ſome Men have greatly prevented their obſerving, as they ought, the Tendencies of Nature; they think to force a *Criſis* when they pleaſe, by boldly adminiſtering ſtrong and powerful Medicines, whereas, it may be, the greateſt Benefit is to be done by the moſt ſimple, eaſy, and gentle Means, or, perhaps, by leaving it intirely to the Management of Nature. Many Inſtances might be alledged to ſhew what vaſt Advantages have accrued by a ſtrict Attendance to the Demands of Nature, without pouring in a Load of Phyſic. Nature is oftentimes conquered by obeying and humouring her; for by diligently watching and obſerving the Ways and Means ſhe makes uſe of, in Order to free herſelf from the Diſeaſe, and then joining with her in the ſame Undertaking, when ſhe needs our Aſſiſtance, we complete the Cure which otherwiſe might have been very uncertain.

274. It is a Precept to be held by all (ſays *Willis)* that you diligently watch and wait

upon the Footſteps of Nature: Which if it works wrongfully, it's Diſorder is to be reduced; if rightly, yet too vehemently, to be bridled: If ſhe works rightly, yet too ſlowly, or more weakly than ſhe ſhould, the Buſineſs will be, that her Endeavour may be incited, and aſſiſted by the Help of Medicine. A great Secret, therefore, in curing Diſeaſes, is to diſtinguiſh rightly between the Efforts of Nature, which are to be aſſiſted, and thoſe of the Diſtemper, which are to be deſtroyed.

275. Hence it manifeſtly appears, that all our *curative Indications* are to be taken from the preſent *Phænomena* of the Diſeaſe, and a diligent Obſervance of Nature, which way moving to help herſelf; that is, if Nature makes but faint or weak Overtures, or if the incumbent Weight is likely to be too great for the utmoſt of her Strength, it is then our Buſineſs to aſſiſt her in ſuch a Way as ſhe ſeemed of herſelf to direct.

276. Thus in the Cure of this Diſtemper, if *bleeding*, *vomiting*, and *diluting Medicines* have been properly preſcribed, and yet the Pulſe continue to be too full and quick, and every Organ ſeems to labour and ſtruggle to get rid of ſome offenſive Matter; our next Step is, if the Body be coſtive, to inject *lenient*,

cooling Clyſters pro Re nata: For a ſmooth emollient Clyſter not only brings away the inteſtinal Load without any Violence or Diſturbance to the Body, but it is a warm Bath to the Bowels, whereby it ſupples and relaxes their Fibres, and abates the too great Conſtriction of the excretory Ducts which open into them. Many of the moſt fluid and ſubtile Particles alſo of the Clyſter, may be conveyed into the Blood through the *Vaſa inhalantia,* and mix with and attenuate the Fluids, and thereby render the excrementitious and morbific Humours minute enough to paſs through the Glandules and Ducts ſituated in the Membranes of the Inteſtines.

277. Hence *Clyſters* do oftentimes diſcharge a deal of Matter from the Blood, as well as bring away the hardened, fœtid Excrements. And let me add, that if the *Fæces* were ſuffered to remain in the Inteſtines too long, they might do much Miſchief, and that for the following Reaſons, *viz.*

I. When the Belly has been long ſhut up, and immoderately charged, ſome Part of the *Fæces* may be percolated into the Blood, contrary to the common Deſign of Nature, and thereby not only augment the

Quantity of the Fluids, but mix with them ſome vitiated Matter.

II. The exceſſive Heat of the Body muſt neceſſarily produce an Abundance of naſty, ſtinking Fumes from the *Fæces*, if retained longer than uſual; and ſuch putrid, corrupted Vapours may poſſibly get into the Blood, and prove very noxious and hurtful to the Conſtitution.

III. The hardened *Fæces* may dilate and diſtend the Inteſtines in ſuch a Manner, as to preſs upon and obſtruct the excretory Ducts of ſome of the *inteſtinal* and *meſenterial* Glands, and by that Means prevent the flowing in of the Juices: For we are aſſured by Experiment, that the thinner Part of the Blood will ooze through every Part of the mucous Coat of the Inteſtines; and that when large Quantities are ſecerned into the Cavity of the *Viſcera*, it is not only from the *Ductus Pancreaticus*, *Cholodochus*, or other large and viſible Ducts, but alſo through an infinite Number of extremely minute, ſecretory Veſſels, diſperſed throughout the inteſtinal Tube.

IV. If the Inteſtines are very replete with hardened Excrements, it may ſo happen that they may preſs upon, and hinder the free ſree Deſcent of the Blood through the *iliac Arteries*; or they may retard the Motion of the Blood in the Coats of the much diſtended Bowels: Hence the Heat may be increaſed by accumulating the Blood in the other Veſſels, and the Head may be affected by Reaſon a larger Share of Blood will be propelled into the *aſcending* Trunk of the *Aorta*, from the *Impedimentum* it meets with in the *deſcending*.

278. *Clyſters*, therefore, may be uſeful, if the Belly does not anſwer, till the *tenth*; nay, ſometimes, to the *twelfth* Day of this Diſeaſe, eſpecially if Bleeding has been neglected in the Beginning; but they are not to be continued afterwards, leſt they drain too much from the Blood, and thereby interrupt a *Criſis*.

279. Another Caution is, that the *Ingredients* with which they are made, ought to be quite mild, ſo that they produce but one or two Stools; for ſhould they exagitate the Blood, and occaſion many Stools, they would protract the Diſeaſe, by thickening the Juices, and retarding Nature's Work, in concocting the morbid Matter.

280. This alſo is to be obſerved, that *Clyſters* are not ſo ſucceſsful, neither ſhould

they be repeated ſo often, in old People as in young. To conclude this Head, Experience teaches us, that great Advantages are received when a moderately fœtid Diſcharge is procured either by Art or Nature.

281. Proper Evacuations being conſidered, our next Dependance in the *Beginning* and *Increment* of this Diſeaſe, is upon ſuch Medicines as will blunt, abſorb, and ſweeten all acrid, ſharp, irritating Juices, which ſtimulate the Fibres, increaſe their Tenſion, and quicken their Vibrations; from whence the Blood is too impetuouſly moved, the Heat is increaſed, and the Blood inſpiſſated.

282. *The teſtaceous Powders*, and particularly the *Pulv, è Chel. Canc. comp.* are generally preſcribed for this Purpoſe; though ſome among us deny the Poſſibility of theſe Medicines entering the Circulation, let them be ever ſo finely levigated; but not to enter into this frivolous Argument, we conſtantly obſerve the beſt, and moſt experienced, *Phyſicians*, preſcribe ſome Preparation or other of the teſtaceous Drugs, in the *Beginning*, and *Increaſe* of *acute Fevers*, and believe them to be very beneficial in correcting and ſubjugating the ſharp, acrid, corroſive Humours, both in the *Primæ Viæ*, and in the Blood

and Lymph, and alſo by gently diſpoſing the Sick to a more plentiful Perſpiration, and ſometimes to little breathing Sweats, without augmenting the Heat of the Body, or endangering Inflammations, *&c.*

283. *Nitre*, or ſome Preparation or other of it, is moſt Times joined with the *teſtaceous Powders*, or diſſolved in the *Drinks*, in the *Beginning* and *Increment* of *ardent Fevers*, in order to cool and abate the Rarefaction of the Blood and Humours, which it does in the moſt effectual Manner; it being of a very refrigerating Nature, and allaying the Heat of the Body better than any other Medicine whatever: On which Account this *Salt* is highly eſteemed, and conſtantly uſed, in all Diſtempers where the Blood boils with fervent Heat.

284. For my Part, I prefer pure Nitre before any Preparation of it, which, inſtead of improving, may really alter it's Nature, or render it impure. Thus the *Sulphur*, which is thrown upon *Nitre*, whilſt in Fuſion, in order to make *Sal Prunellæ*, may leave ſuch Matter behind it, as may render it hot, acrid, and alkaline, or not ſo good a Medicine as before; for it is certain that purified Nitre

may be turned into a fixed *Alkali* *, as violent as *Salt* of *Tartar* itſelf, merely by putting a ſmall Portion of *live Charcoal* into the Crucible, whilſt the *Nitre* is fuſing: Whence I ſhould think the *Lapis Prunellæ* is to be ſuſpected, as being a Sort of *Sal Polychreſtus*, or, at leaſt, pure Nitre is preferable to it, as containing nothing ſuſpicious, and being the moſt effectual Cooler of the Blood in all Nature. Some, ſays *Geoffroy* †, have, without Ground, ſuſpected Nitre to be of a firey and cauſtic Quality; for which they have had no other Foundation but the Authority of the Ancients, who called their Nitre cauſtic, and the Deflagration of our Nitre with Charcoal. To correct this imaginary igneous Quality, they order it to be burned with Brimſtone, or ſome ſuch Subſtance. But, in the firſt Place, all theſe Operations have proceeded from a Miſtake; and, in the next Place, theſe Concretions rather deſtroy than improve the natural Qualities of Nitre; and, accordingly, the beſt Chemiſts agree, that Salt-petre, well purified and cryſtallized, or melted, and formed into little Tablets, by the Name of

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[*] Vide *Boerhaave*'s *Chemiſtry*.

[†] Vide his *Treatiſe of foſſil, vegetable, and animal Subſtances.*

Cryſtal Mineral, is to be preferred to all the other Preparations of it.

285. When the Head is vaſtly affected with racking Pains, or when an obſtinate Watching threatens a *Delirium*, *Epithemas* are profitable, of the warm Fleſh, or Inwards of Animals, applied to the Soles of the Feet; or I have known good Succeſs from bathing the Feet in warm Water, which, relaxing the Veſſels, and encouraging the Blood to deſcend more freely into the Feet, has, by that Means, cauſed a *Revulſion* from the Head, and laid the Sick placid and eaſy, and ſometimes inclined him to Sleep.

286. Setting the Patient upright, if he be ſtrong enough to bear it, or bolſtering him up with Pillows, may alſo be ſerviceable, by retarding the Motion of the Blood to the Head, and abating it's Impulſe on the *Meninges*, and nervous *Tubuli* of the Brain.

287. We have already taken Notice of the great Advantages of letting in, or perflating the Patient's Room with freſh cool Air; to which we may add, if the Floor be ſprinkled with *Oxycrate*, or *Roſe-Water* mixed with *Vinegar*, and a little *Nitre*, it might be highly uſeful: For though it may be ſuſpected that groſs Air cannot get into

the Blood either through the Pores of the pulmonary Membranes, or thoſe of the *Epidermis*; yet it is certain, that the *Effluvia* wherewith the Air is impregnated, do paſs the abſorbent Veſſels; and conſequently an Air, wherein ſub-acid, nitrous Matter is plentifully diffuſed, may be of great Importance in reducing the Rarefaction, Motion, and Heat of the Blood.

288. It is well known, that when Air has been confined, for ſome Time, in a hot, cloſe Room, and is diſqualified, as it were, for Reſpiration; or when it is grown offenſive by the Vapours ariſing from the Bodies of many People, *Vinegar* will purify it. *And it has been proved by Experiment, that Air which paſſes through Cloths dipped in Vinegar, may be breathed to and fro as long again as the like Quantity of Air which is not thus purified. *Vinegar* has long been looked on as anti-peſtilential; whence it is probable, that there may be a Ferment between this Acid, and the then too alkaline Air, which may thereby be reduced in ſome Degree from it's alkaline, to a neutral, more wholeſome State; for many acid and alkaline Mixtures produce neutral Liquors.

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* Vide *Hales*'s *Statical Eſſays*, Vol. II.

289. The Rigidity and Dryneſs of the Veſſels alſo may be abated, by rendering the Air of the Chamber moiſt, eſpecially in hot and dry Weather. The Lord *Bacon* * obſerves, that there are Vapours that moiſten, refreſh, and are proper in burning Fevers, Conſumptions, and Want of Sleep; ſuch, for inſtance, as *Roſe-Water*, *Vinegar*, *Violets*, *Vine-Leaves*, &c. And again, ſays the ſame *great Man*, there are two Things which internally cool and condenſe the Spirits; and I recommend the ſame to be tried externally in Vapour. The one is *Nitre*; which I would have diſſolved in *Malmſey*, or *Greek Wine*, and the Smell of the Wine received; or, to make it more forcible, pour ſome of it upon a heated Fire-Shovel, as they do Roſe-Water, and Vinegar. The other is diſtilled Water of *Wild-Poppy*, which may be mixed, in equal Parts, with *Roſe-Water*, and ſo received, with the Addition of a few *Cloves*, in a perfuming Pan.

290. *Lommius* † adviſes the Room and Bed to be ſtrewed with the Branches of *Willow* or *Vine*. And I once remember (ſays *Boerhaave* ‡) that, having a Patient

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* Vide *Sylva Sylvarum.* † Vide *Cure of Fevers.*

‡ Vide his *Chemiſtry.*

who was exceedingly reſtleſs and delirious in a Fever; I brought a Bough of *Elder*, with the Flowers on it, into his Chamber, and putting them into ſome warm Water, they breathed out their native Spirit into the Room, after ſuch a Manner, that the Man was ſoon compoſed, and fell into a quiet Sleep; out of which he awaked greatly refreſhed, and afterwards recovered. Something like this I lately met with. Being called to a young Man in a violent Fever, I found him almoſt ſuffocated under a great Heap of Bed-Clothes, and in a very cloſe ſmall Chamber. When I firſt opened the Door, I never ſmelled any thing more diſagreeable; and, indeed, I refuſed ſtaying in the Room, till the Door and Window had been opened ſome Time; I alſo ordered the Room to be ſprinkled all over with Vinegar. When I returned, my Patient told me I had cured him already, for he could now breathe with great Eaſe, and found his Spirits vaſtly revived. Indeed, he ſeemed to recover from that Time, having a very good Night's Reſt afterwards.

291. In ſhort, the Adminiſtration of Steams or Vapours has not, as yet, been adverted ſo much as it ſeems to deſerve; there

being nothing to contra-indicate their Uſe, nor hardly any Diſtemper but what they may be ſuited to. Dry and tenſe Fibres may be ſoftened and malaxed, by their Humidity and Smoothneſs; moiſt, flabby, and looſe Veſſels may be rendered more elaſtic by ſuch Steams as contain acrid, pungent, ſtimulating Particles; alkaline Humours may be altered into a neutral State, by acid Vapours; and *vice verſa.*

292. *An immoderate Looſeneſs* ſometimes happens towards the Height of this Diſeaſe, eſpecially if neceſſary Vomits were omitted in the Beginning; and this Sort of Looſeneſs is dangerous, becauſe the Sick is enervated thereby, and a *Criſis*, or Depuration of the febrile Matter is retarded many Days longer than it would otherwiſe have been. In ſuch a Caſe, a gentle *Emetic* may ſtill be proper, and afterwards moderate *Aſtringgents*, and *Opiates*, muſt be complied with, in ſmall Quantities.

293. When *Spots* appear in Fevers, take Care how you make any Efforts upon the *firſt Paſſages*; becauſe if they ſhould repel the Matter back again into the Blood, *Anguiſh, Difficulty of Breathing, extreme Proſtration of Spirits, Delirium, and Convulſions*

commonly follow. The later the Spots appear, and the nearer to the *Status* or Height of the Diſtemper, they are ſo much the better; for then the Diſeaſe tends to a *Criſis*, or Concoction; And, therefore, the Eruption ought to be promoted by gentle *diaphoretic Medicines*.

294. Having given full Directions for the Management of the Sick in the *Beginning* and *Increment* of this Diſeaſe, we come now to the *ſtationary Period*, where we are to expect the Symptoms to be moſt violent, by Reaſon a *Criſis* ſeldom or never happens without an Exacerbation of them. Every Power exerts itſelf, at this Time, to ſubdue and concoct the febrile Matter; the Arteries vibrate with the greateſt Swiftneſs, each Veſſel is more than ordinarily tenſe and contracted, the Heat of the Body is raiſed to the higheſt Degree, the Humours are attenuated and divided by the violent Impulſe of the Solids; and all this is done in Order to correct, alter, ſeparate, and diſpoſe the morbid Matter to ſecrete, and be excreted.

295. *Criſiſes*, therefore, are only the Effects or Conſequents of the wonderful Fabric and Mechaniſm of the Body; for in Conſequence of the Conſtruction of the ſe-

veral motive Organs, and of the Affinity and Conſent of Parts, when ſome of the *Viſcera* are diſtended or vellicated, by the Abundance, or Acrimony of the noxious Matter, the whole Machine, by ſuch Irritation, is made to contract more vigorouſly; and it is ſurpriſing to ſee what vaſt Commotions or Conflicts ariſe, how every vital Powers exerts itſelf, and how much the *poor Patient* is diſtreſſed, in Order to get rid, perhaps, of a very inconſiderable Quantity of morbific Matter.

296. As *Crudity* ariſes from too ſtrict a Union, or too cloſe a Coheſion of the component Particles of the Fluids; ſo by *Concoction* of the Humours is to be underſtood, that they have acquired ſuch a Diſpoſition as makes them more fit than before, to be ſeparated from the ſounder Portion of the ſanguineous Maſs, or from the conſiſtent Parts to which they, perhaps, adhered, and to be afterwards expelled out of the Body.

297. This then being the Caſe, we ought at this Time, to be more than ordinarily diligent and watchful, and to obſerve by what Means *Nature* attempts to throw off the febrile Matter; for as a *Criſis* is uncertain when it will happen, ſo alſo by what Paſ-

ſages or Outlets the Morbid Matter will be excreted, is, *à priori,* to us impenetrable. This depends upon the different Degrees of Concoction; that is, if the Matter be properly digeſted or attenuated, and ground fine enough to paſs the ſecretory and excretory Ducts of the *ſubcutaneous Glandules*, the Fever is ſolved chiefly by *Sweat*; in others, where the morbid Matter ſuits only the *Tubuli* of the *meſenterial* Glands, it goes off by *looſe* and *fœtid Stools*; in others, by *turbid Urine*; in ſome, by *violent ſpitting* or *vomiting*; or by a *ſpontaneous Eruption of Blood*: And in others, them orbific Matter is caſt off from the Blood into the *Interſtices* of the *Muſcles*, and there forms an Abſceſs. But by whatever Outlet *Nature* endeavours to throw off the noxious Matter, this may be laid down as a perpetual Rule, *viz.* That ſhe ought to be incouraged and aſſiſted, unleſs it ſhould happen to fall upon ſome of the inner *Viſcera*, or ſeize upon ſome moſt noble Part, or run off in ſuch Quantities as would inevitably deſtroy the Patient.

298. Hence it appears that when the Fever has attained it's Height, and the offending Matter is concocted, fluctuating, and ready to be evacuated; that is, when the

Texture, Figuration, and Bulk of the febrile Particles are ſo altered and commuted, as to be capable of paſſing the minuteſt *Foramina* of the Body, and yet *Nature* is not able to direct it to it's proper *Exit*; it is then conſiſtent with right Reaſon to give her ſome Aſſiſtance: But if ſhe ſeems to be capable of duly finiſhing every Thing herſelf, we are not to interrupt her by ſtrong Medicaments, or other Irritations, but ſuffer her to take her own Courſe in excreting the morbid Matter.

299. Mr. *Boyle* obſerves, that ſeveral *Phænomena* of Diſeaſes may be illuſtrated by ſuppoſing Dirt thrown into a Phial of fair Water, and then the Phial to be ſhaken; whereby the Water will loſe it's Tranſparency, upon a double Account; that of the Dirt, whoſe opake Particles are confounded with it, and that of the Bubbles, which ſwim at the Top of it: Yet to purify this Water, and make it recover it's former Tranſparency, there needs no particular Care or Deſign of Nature; but according to the common Courſe of Things, after ſome Time the Bubbles will break and vaniſh at the Top, and the earthy Particles which compoſe the Mud, will, by their

Gravity, ſubſide to the Bottom, and ſettle there, whence the Water becomes clear again.

300. Thus in a Fever; when the morbific Matter, or *Lentor*, is attenuated, diſſolved, and diſlodged from the Capillaries, and ſet afloat in the Blood, the Blood may be compared to dirty Water, full of heterogeneous or unaccuſtomed Particles; but according to the common Courſe of Nature, in Virtue of the mere Mechaniſm of our Bodies, theſe morbid Particles, being ground fine enough, are oftentimes diſcharged out of the Body, through ſome of the excretory Ducts, and the Blood left in a pure State.

301. The firſt Appearance of Concoction is generally obſerved in the *Urine*; which, if it hath a white *Hypoſtaſis* ſmooth and equal, prognoſticates a Solution of the Diſeaſe; by Reaſon that ſeems to conſiſt of Part of the peccant Matter, which beginning to be ſeparated from the Blood, or diſlodged from the capillary Veſſels, mixes with the Urine, and is not uſually diſtinguiſhed from it, whilſt this Liquor is warm; but when grown cold, appears in a diſtinct Form, and on Account of it's Weight, ſubſides to the Bottom.

302. Hence it follows, that when the febrile, ſaline, and ſulphureous Particles are rendered ſmall enough to paſs the *renal Tubuli*, a little further Diminution will make them fit to be exterminated through the *ſubcutaneous Glands* by Sweat; and as that is the largeſt Evacuation which can poſſibly be made from the Blood, in the ſame Space of Time, it is moſt capable of excreting the morbific Particles, and conſequently of giving the moſt immediate Relief.

303. If, therefore, any Medicines are thought proper, it is conſiſtent with the *Conatus* of Nature to exhibit, at this Time, *mild Diaphoretics*, joined with large Draughts of *emollient*, *diluting Liquors*, in order to promote and forward the *Criſis*; it being moſt natural to conceive, that a Diſeaſe which proceeds from, or is ſupported by, a Stoppage of the Pores, ſhould, when Nature, or a proper Uſe of Medicines, has prepared the Humours in Order thereunto, be carried off by the ſame Paſſages; eſpecially if the Work can be accompliſhed by Means which do not diſturb or over-heat the Blood, and is attempted at ſuch Times, as Nature herſelf does indicate.

304. This, ſays *Lommius*, is the only Time when *cold Water* may be given with ſucceſs;

not in Order to promote the Concoction; which is now completed, or ſuppoſe it be not; yet it cannot receive any Aſſiſtance from the Uſe of cold Water; but as this cold Water may begin ſome critical Evacuation either by *Sweat, Urine, Stool*, &c. It has been obſerved *, on drinking a great Quantity of Water, as *three* or *four* Pints at a Time, that all the Parts of the Body, and even the Fingers, have been dilated: The drinking of Waters ſhould ſeem, therefore, to be of Uſe at this Time, by inlarging the *Areas* of the tranſverſe Sections of the Veſſels; whence the ſecretory *Tubuli* may be ſet to work, and the excretory Ducts kept in full employ to carry off the febrile Matter.

305. As to the *Quantity* of cold Water to be taken in, and what Obſervations are neceſſary to be made in drinking it, the above mentioned *Author* † has fully explained in his *Treatiſe of continual Fevers*, to which I refer the *Reader* for further Satiſfaction in this Point.

306. We come now to conſider what is to be done, when a *Diaphoreſis* cannot be raiſed either by the Strength of Nature or Art; that is, when the capillary Veſſels which conſtitute the *miliary* Glands, are ſo

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* Vide *Hales*'s *Statical Eſſays*, Vol. II. † *Lommius.*

tenſe and contracted, or the Texture and Coheſion of the febrile Matter is ſo ſtrong as to overcome the natural Powers, and render them too weak to alter it's Figuration and Bulk ſufficient for a critical Diſcharge by *Sweat.*

307. In ſuch a Caſe, the moſt experienced Phyſicians adviſe us to make an Attempt upon the *Bowels*, ſince the inteſtinal Glands are adapted to throw off corrupted Humours from the Blood, which are too groſs to be expelled by any other Canals; and ſince there ſeems to be ſo much Conſent between the excretory Ducts ſituated in the Bowels, and thoſe of the Skin, that when the uſual Diſcharge by one is obſtructed, the other is generally increaſed, and *vice verſa.*

308. But in preſcribing *cathartic Medicines* we ought conſtantly to have in View the State of the Patient, to obſerve each Symptom, and from thence to deduce our Reaſons for Purging. To be over-haſty may endanger the Welfare of the Sick; for to meaſure the Neceſſity of Evacuation by the Vehemence of the Symptoms, is a Precept not always to be regarded; ſince we may thereby weaken the Powers of the Body, ſtruggling with thoſe very Symptoms,

and diſturb Nature, who is working her own Deliverance. And to be negligent and careleſs, and not to purge at all, or too late, when there is Occaſion for it, may be equally dangerous.

309. *Helvetius* * has laid down the following Symptoms, denoting the Humours fit for Expulſion by Stool:

1. The Heat and Dryneſs of the Skin and Tongue are conſiderably abated, and thoſe Parts become moiſt.

2. The Pulſe are not ſo hard and contracted.

3. The Beats of the Arteries are not ſo dry, and are more diſtinct.

4. The Parts are leſs firm to the Touch.

5. The Tendons of the Wriſt are more ſupple, and not ſo tenſe as before.

6. The Muſcles of the Belly leſs rigid, and more flexible.

7. The Belly, though inflated, yields to the Touch, eſpecially about the *Hypochondria*.

8. The Patient has Grumblings in his Belly, and an Inclination to go to Stool.

9. The Excrements diſcharged that Way, have acquired their proper Coction and Colour. They are not crude, but thick, yellow, or brown.

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* Vide his *Eſſay on the Animal Oeconomy*.

10. The Urine loſes it's former Qualities: It becomes leſs red and ardent, or leſs crude, and better coloured.

11. The Patient's Thirſt is abated.

12. The Violence of the Symptoms, which aroſe along with the Fever, is mitigated and diminiſhed.

310. Now, if theſe moſt excellent Rules had always been attended to, and thoroughly underſtood, the *Cure of Fevers* would have been reduced to greater Certainty than I fear it is at preſent. *Concocta purgare & movere oportet, non cruda*, ſays *Hippocrates* *, who very often inſtituted Purging in *acute Fevers*; and more particularly when they aroſe from a Redundancy of Bile.

311. If we purge before the Humours are ſufficiently concocted, and whilſt the whole vaſcular Syſtem is much too tenſe, there will be only ſome clear, ſerous Liquor ſqueezed out of the inteſtinal Glands, whereby the *Lentor*, or febrile Matter, will become more groſs and viſcid, and conſequently more likely to fix upon, and be riveted in, ſome of the glandulous Bodies: And if we neglect this Evacuation when the Humours are duly prepared for Excretion; when they

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* Vide *Aphor*. 22. Sect. I.

float about, and are tranſlated from Part to Part, and *Nature* only wants an additional Impulſe to diſcharge them; the Danger will be very great on that Side, leſt they ſhould ſeize upon ſome *Viſcus*, and excite a fatal Inflammation.

312. The whole Hiſtory of Phyſic does not afford, that I know of, any Inſtance of Recovery from this Diſeaſe, without ſome Diſcharge from the Blood; but, on the contrary, we meet with innumerable Inſtances where even a *few Stools* have averted a whole Train of Evils, and delivered the Patient from the very Jaws of Death. We are not, therefore, to be afraid of raiſing the Heat of the Body by this Method of Purging; ſince thoſe Things which are adviſed at this Time, are the moſt *lenient*, *mild*, and *moderate*: And Experience teaches us, that if they diſcharge their Office kindly, by purging off the cruder Humours, the Urine, at the ſame Time, generally lets fall a thick Sediment, and grows better coloured; the Pulſe ſink, and beat more even; the Concoction is haſtened, and the Cure perfected by repeating the ſame Kind of Medicines at proper Intervals.

313. They trifle egregiouſly, therefore *, who wait an univerſal Declenſion of the Fe-

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* Vide *Lommius* on *Fevers.*

ver before they purge. For they, by ſuſpending all neceſſary Aſſiſtance, permit a violent Diſtemper to prey upon the Life of the Patient, and preſcribe *Phyſic* at that very Time, which, if the Diſeaſe is really decreaſed, is, according to *Galen*, intirely void of Danger, and when the Body is almoſt wholly freed from the morbid Matter.

314. From what has been ſaid it plainly appears, that though *Hippocrates*'s Rule is perpetually to be obſerved, to wit, *not to purge in the Beginning of acute continual Fevers*; yet after the morbid Matter is, in ſome Meaſure, ſubdued, when it is attenuated, looſened, and made fit to paſs the meſenterial Glands, we may purge with Safety, without any Danger of increaſing the Fever, or producing Inflammations. But one Caution may be neceſſary; and that is, not to give the full Doſe at once, but rather at two or three Times, at proper Diſtances; drinking between each, a large Draught of *Gruel* or *Poſſet-Drink*, by which Means an *Hypercatharſis* may be prevented, and the Sick ſecured from being purged beyond his Strength.

315. As to other *critical* Evacuations, *viz.* by *Spitting*, *Vomiting*, *Hæmorrhage*, *Abſceſs*, &c. great Care is to be taken not to ſuppreſs

them; for as they are oftentimes very important and beneficial Evacuations, they ought, by all proper Means, to be induſtriouſly promoted, and by no Means ſuppreſſed, unleſs they ſhould prove exceſſive, and productive of ill Symptoms.

316. Not long ſince I was called to a *young Man*, on the *ninth Day* of an *acute Fever*, which he caught by working hard in extreme hot Weather, and drinking large Draughts of cold ſmall Beer whilſt he was very hot. I found him vomiting up vaſt Quantities of *bilious Matter*, and diſcharging ſo much by *Seige*, that *Lypothymies* came frequently upon him; his Pulſe were ſo low and quick as ſcarce to be felt or diſtinguiſhed; the extreme Parts were cold; and clammy Sweats broke forth, with Hiccoughs, *Subſultuſes*, &c. In ſhort, he was the ſickeſt Man I ever ſaw who did not die. Upon Inquiry his Friends told me (for he was not able to ſpeak) that his Fever had been exceedingly high, with great Thirſt, Reſtleſſneſs, Pains in the Head and Back, *Delirium*, &c. till the Vomiting and Looſeneſs came upon him, which, at firſt, gave him great Eaſe; but as he had had above a *hundred* Stools in 48 Hours, and had vomited up ſeveral *Quarts* of ſuch Matter as

I there ſaw, the vital Powers were now reduced ſo exceedingly low, that unleſs this ſuperabundant Flux could be immediately ſtopped, Death muſt inevitably be the Conſequence of it, and that very ſoon. Indeed the extreme, quick, low Pulſe, cold, clammy Sweats, *Subſultus Tendinum*, &c. exactly reſembled thoſe of an Animal bleeding to Death; ſo that though the Diſcharge was manifeſtly *critical*, yet as *Nature* vaſtly exceeded her Bounds, it behoved me to check and repreſs her exorbitant Motions, as ſoon as poſſible; which, with the Aſſiſtance of *Opiates*, *cordial Aſtringents*, and *bliſtering Plaiſters*, was happily effected.

317. This brings to my Mind the Character which the excellent Mr. *Boyle* gives of a *Phyſician*. I look upon a good Phyſician, ſays he, not properly as a Servant to Nature, but a Counſellor, and a friendly Aſſiſtant; who, in his Patient's Body, furthers theſe Motions, and other Things, that he judges conducive to the Welfare and Recovery of it: But, as to thoſe that he perceives likely to be hurtful, either by increaſing the Diſeaſe, or otherwiſe endangering the Patient, he thinks it his Part to oppoſe or hinder, though *Nature* manifeſtly ſeems to endeavour

to exerciſe or carry on thoſe hurtful Motions.

318. Hence we are to follow the Guidance of Nature whereſoever ſhe appears to move right, and within bounds; and if her Efforts are too weak to eject her Enemy, or inſufficient to relieve the Symptoms, we are to aſſiſt her: But when ſhe over-acts her Part, and endangers Life, by violent Motions, and exceſſive Excretions, it is our Duty to oppoſe her; and certainly all Evacuations which reſult from a Colliquation of the animal Fluids, or which depreſs the Spirits, and diminiſh the Strength, beyond a reaſonable Degree, are hurtful, and ought, by all proper Methods and Medicines, to be reſtrained.

319. We are now arrived to the laſt and moſt diſmal State of this Diſeaſe; and that is, when no *Criſis* can be obtained, either by the Strength of Nature, or the Power of Art. In this moſt deplorable Circumſtance we can have but little Hopes; the Sick muſt neceſſarily begin to ſink under the too great Weight of the Diſtemper; the *Plethora* will increaſe to ſuch a Degree of Plenitude, that the Veſſels will not be able to puſh on their contained Juices as uſual; and, for Want of ſufficient Motion, the viſcid Parts of the Blood will coaleſce, and form Grumes or

Clots; the Humours will ſtagnate, and become more putrid; the Quantity of animal Spirits will greatly decay; the Solids will be more and more relaxed; the Pulſe will grow low and ſlow; and a *Stupor*, *Subſultus Tendinum*, cold and clammy Sweats, *&c.* will now appear, which are remarked above to be the Forerunners of Death.

320. In this Caſe, the *curative Indications* are quite different from thoſe already mentioned; all cooling, and refrigerating Medicines will now be detrimental; inſtead of which, ſharp, acrid, volatile, pungent ſtimulating Things take place. *Bliſters* here are of the greateſt Service, to excite Motion, and to rouſe up the drooping Spirits. The languiſhing Pulſe dictates now, and oppreſſed Nature calls for the moſt agile Remedies; ſuch as the *volatile Salts*, *Camphor*, *Caſtor*, *Saffron*, *Rad. Serp. Virg. Rad. Contrayerv. Theriac. Ven. Pulv. ad Guttetam*, *Confect. Raleighan. Alchermes*, *Spt. Corn. Cervi*, *Spt. Sal. Armoniac. Lavendul. Sal. Vol. ol. Aq. Pæon. & Epidem.* &c. Some of theſe Sort of Medicines, waſhed down with large Draughts of comfortable diluting Drinks, are moſt likely to reſtore the Power of the Solids, and to thin, divide, and produce inteſtine Motions among the Fluids; and, if

Nature is not too far ſpent, if the vital Powers, or the Faculties of the Body are not ſo far weakened or depraved, as to be utterly unable to perform the Functions neceſſary to Life, or at leaſt to actuate and aſſiſt the Remedies employed; ſome ſuch like Medicaments as theſe may reſtore a proper Motion to the Blood, and produce a *Criſis*: But ſhould they not be ſucceſsful, there can be no Objection made againſt their Uſe, ſince, according to the foregoing Theory, they are the only Anchor we have left to depend upon; and it is much more eligible to try a doubtful Remedy than none at all.

321. I have known a Fever baffle all theſe, and many more Medicines; and when the Patient has lain ſeemingly in the utmoſt Agonies of Death, *Nature* has ſurpriſingly brought on a *Criſis*, and thoſe Symptoms which, juſt before, threatened immediate Death, ceaſed as it were in an Inſtant, after the noxious febrile Matter was excluded. I adviſe, therefore, *young Practitioners*, not to abandon their Patients, or leave them for dead before they are actually ſo: For ſhould any *old Woman* come in afterwards, and give but two or three Spoonfuls of the moſt *ſimple, diſtilled Water*, and a *Criſis* ſhould happen,

merely by the Strength of Nature, I need not ſay how much ſuch a Thing would be reported to their Diſadvantage.

322. *Hippocrates, de Locis in Homine*, 36, ſays, When the Diſeaſe is extremely dangerous, Experiments ought to be tried: For if they ſhould ſucceed, you recover the Patient; and if not, he only ſuffers what would otherwiſe have happened. To pronounce Diſeaſes incurable (according to the Lord *Bacon* *) is to eſtabliſh Negligence, and Careleſſneſs, as it were by a Law; and to ſcreen Ignorance from Reproach.

323. Let our Care, therefore †, be to comfort and refreſh our Patients, in the very Agonies of Death; for it is the moſt ſcandalous Thing in the World for a Phyſician to turn his Back upon a Diſeaſe as incurable and bid Adieu to his Patient, two or three Days before he dies. We ought ſtill to try new Remedies, and ſhift about upon ſeveral Sorts, to the very laſt Gaſp: For while the *Soul* hovers within the Body, there is ſtill Hopes to be placed in our admirable Art.

324. Dr. *Turner*, in his *Diſcourſe concerning Fevers*, gives us a ſurpriſing Inſtance of this Kind; and, indeed, it were doing no

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* Vide *de Augm. Scient.* † Vide *Baglivi's Practice of Phyſic.*

ſmall Service to Mankind *, to make a Collection of the Cures of ſuch Perſons as have recovered after being pronounced incurable by the *Doctors*, to prevent them for the future, from fathering their own Ignorance upon the Weakneſs of Nature; and pretending to the World that the Art of Phyſic muſt fail with their Skill. Nor ſhould the Cures of Nature be omitted in ſuch a Catalogue, becauſe they ſhew what may, poſſibly, be done by natural Means, to evacuate the morbific Matter, or change it's Nature; or elſe how far the Tone of a Part, or Strength of the Body may be vitiated or impaired, whilſt it remains capable of ſome Reſtitution.

325. That in acute Diſeaſes, Perſons given over by Phyſicians have recovered, none will deny. *Celſus* ſays, it ought to be obſerved, in acute Caſes, that the Signs of Life and Death are very fallacious. And *Hippocrates*, that Maſter in *Prognoſtics*, allows them to be very uncertain. Whence we may ſee the Truth of the *French Proverb*. *viz. It is better to be ſentenced by the Doctor, than the Judge.*

326. I ſhall conclude this Chapter with taking ſome ſhort Notice of the Rules to be

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* Vide *Boyle on the Uſefulneſs of Philoſophy.*

obſerved after the *Criſis* is completed, and the Fever gone off.

327. *Firſt, Quæ relinquuntur in Morbis poſt Criſim, recidivas facere ſolent* *: Whence it has been a general Cuſtom, and ſurely for good Reaſons, to exhibit a *lenient Purge* or two, leſt any of the febrile Matter ſhould remain in the Blood, and be liable to aſſimilate the Humours again, and to generate Obſtructions.

328. *Secondly*, When the Blood is perfectly defœcated, and purged of all it's Recrements, our greateſt Care ought to be to recover the Tone of the *Viſcera* which may be weakened, either from Obſtructions which happened in them during the Violence of the Fever, or from the *Criſis* falling upon them at the latter end. For this Intention the *Bath*, *Tunbridge*, *Spaw*, *Pyrmont*, or other *chalybeat Waters*, with *Bitters*, are generally preſcribed.

329. *Thirdly*, Great Care ought to be taken in Regard to the *Food*; which ought to be ſlender, light and eaſy of Digeſtion: For ſince the *Viſcera* are weak, and the Tone of the whole vaſcular Syſtem is in a great Meaſure abated of it's natural Vigour, the Veſſels cannot digeſt or aſſimilate much, or

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* Vide *Hippocrates Aphor.* 12. *Sect.* xi.

ſtrong Food. The *Drink* ſhould be ſmooth demulcent, nutritious.

330. *Laſtly*, *Moderate Exerciſe*, in a clear Air, ſhould be uſed for ſome Time; by which the Body will be made relatively, as well as abſolutely, lighter; the Fluids will be ground finer; the Secretions and Excretions will be properly performed; the Joints, Ligaments and Muſcles will be freed from any excrementitious Matter which may happen to be lodged in them, or hang about them: Whence the Strength will return much ſooner than it otherwiſe would, and all the animal Functions will be performed with their uſual Force and Vigour.

CHAP. IV.

Of the Antecedents *to an intermitting* FEVER.

331. FROM what has been ſaid in the preceding Chapters it appears that an *animal Body* is a delicate Machine, conſiſting of *Solids* and *Fluids*; and that perfect Health depends upon a juſt Balance between the elaſtic, contractile, impulſive Force of the ſeveral Series of Veſſels, and a proper

and equal Reſiſtance from the ſeveral Orders of Fluids, circulating through their reſpective Veſſels.

332. From this general, though imperfect Sketch of the *animal Oeconomy*, it is eaſy to apprehend, that Diſeaſes may be brought on by almoſt innumerable Cauſes: For whatever will render the Fibres too dry, elaſtic, and tenſe, or too moiſt, ſupple, and flaccid; whatever will make the Blood too viſcid, glutinous and ſizy, or too thin, limpid, and ſerous; whatever will impregnate the Blood with too many active, ſaline, ſulphureous, bilious Corpuſcles, or with too many poor, inſipid, polite, ſmooth, watery Particles; whatever will procure in the Humours, a Tendency towards an acid, or an alkaline Diſpoſition; whatever will over and above promote, or retard any of the Secretions or Excretions; and, *laſtly*, whatever will increaſe, or diminiſh the Velocity of the Circulation, or augment, or rebate the vital Heat and Vigour of the Body, beyond ſuch a Degree, will be the primary and immediate Cauſe of ſome Diſeaſe or other.

333. Now which are the *productive Cauſes of intermittent Fevers*, or *Agues*, and from what Sources they ſpring, is the Buſineſs of this Chapter.

334. *Firſt* then, the moſt common *Procatartic*, or external Cauſe of this Diſeaſe, is *a moiſt Conſtitution of the Air*. An obſerving Perſon may perceive his Fibres to grow ſtrict or lax; or, in other Words, he may find himſelf more chearful, briſk, and gay, or more depreſſed and melancholy, according to the State of the Air; and many who live healthy in a dry Air, ſoon fall into all the Diſeaſes that depend upon a Laxity of the Fibres, by removing into one that is moiſt.

335. It is agreeable to common Obſervation, that the *Inhabitants* of *damp, wet, moiſt Countries* are generally bloated, leucophlegmatic, and dull; ſubject to Catarrhs, and Seroſities of all Kinds, from the Relaxation of their whole vaſcular Syſtem, occaſioned by the Moiſture imbibed from the Air through the Pores of the Skin.

336. Hence it is, that *Intermittents*, or *Agues*, are ſo rife in moiſt, damp Places, near the *Sea-ſide*, or in low, marſhy Grounds; as in the *Fens of Cambridgeſhire*, or in the *Hundreds of Eſſex*, &c.

337. A very moiſt Air inſinuates itſelf into the Pores of the moſt compact Bodies, and conſequently it muſt affect human Bodies to a ſurpriſing Degree, by relaxing the

Fibres, and weakening their contractile Force. If we conſider that the external Superficies of the Body is beſet with an infinite Number of *Vaſa inhalantia*, which ſtrongly imbibe and abſorb the Vapours diffuſed in the Air, it will be eaſy to apprehend, that Air abounding too much with watery Particles, muſt be pernicious to our Conſtitutions; and that for the following Reaſons:

I. When the Fibres are ſobbed and ſoaked in too much Moiſture, their moſt active, ſtrongly-attracting, compounding Particles will be disjoined, and removed further from each other; whereby the conſtituent *Fibrillæ* of all the Veſſels will ſwell and grow ſoft, ſpungy, flaccid, and relaxed.

II. From a Laxity, Weakneſs, and Want of due Tone and Elaſticity in the Fibres, the Pulſe will grow weak and ſlow, and the vital Vigour of the Body will be rebated, in Proportion as the *Vis Inertiæ* prevails; it being a well-known Law in *Mechanics*, that the weakening the motive Powers of any Body, is the ſame as increaſing it's Reſiſtances, with regard to it's Percuſſion, and *vice verſa.*

III. The Velocity and Force of the Circulation being diminiſhed, the Blood will not be duly attenuated, and the ſeveral Orders of Globules will coaleſce; whereby the Humours will become viſcid and glutinous, or Corpuſcles will be formed too bulky to paſs freely through the minuteſt *Tubuli* of the Body: For it is evident, from repeated Experiments and Obſervations, that the Blood may acquire a Viſcidity or Foulneſs, (though of a contrary Nature) either from too languid, or too quick a Circulation. By too ſlow a Motion, the earthy, ſaline, and oleaginous Parts of the Blood may aggregate and unite themſelves together, for want of proper Power in the Veſſels to prevent their obeying their own proper Laws of Attraction, eſpecially in the remoteſt capillary Tubes, where the Circulation is always ſloweſt; whilſt the moſt ſerous, watery Parts are ſqueezed forwards by the weakeſt Efforts of the Veſſels.

IV. Hence the *Secretions* and *Excretions* may be rendered imperfect, and many morbific Particles retained in the Habit, for Want of due Force and Vigour in the vaſcular Syſtem to comminute the Humours, and prevent the Blood-Globules from running into unnatural Grumes and Clots.

V. The watery Particles floating in the Air, may paſs directly into the Blood, through the *Vaſa abſorbentia*, and recurrent Veſſels;

and ſuch an Admiſſion of mere Water into the animal Fluids, in large Quantities, may render the Blood and Humours too inert and inactive, by diſſolving and breaking the *Spiculæ* of the ſaline, oleaginous, and bilious Particles: On which Account alſo, the Fibres will be more and more relaxed, and the vital Vigour debilitated.

338. We are aſſured by Dr. *Keil* *, that he gained *eighteen* Ounces in one Night, from the moiſt Air; which is enough to produce ſurprizing Effects; and, if continued long, to deſtroy the natural Heat, and vital Force, of the ſeveral Powers of the Body.

339. Warm-Bathing increaſes the Weight of the Body for the preſent, though it cauſes a plentiful Perſpiration afterwards.

340. It is not to be inferred from hence, that ſince Water diffuſed in the Air, in moiſt Weather, or damp Places, may produce Diſeaſes in human Bodies, that, therefore, it cannot be wholeſome to drink Water, or to go into the Cold-Bath: † For this Inference will not follow, as will appear if a few Things are conſidered; *viz. Firſt*, That the Water received into the Stomach by Drinking, mixes with the Contents of the Stomach;

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* Vide *Medicina Statica Britannica.*

† Vide *Lobb*'s *Rational Methods of curing Fevers.*

mach, with the Chyle, with the bilious and pancreatic Liquids, before it paſſes through the Lacteals into the Blood; and ſo cannot this Way act on the animal Fluids, and Solids, as ſimple Water; or that Water may do, which is imbibed through the Superficies of our Bodies directly from the Air into the Blood, and Lymph: But yet Perſons may drink too much Water, and thereby weaken their Fibres, and too much dilute their Fluids, and bring on, or increaſe, ſome Diſeaſes. Watery Drinks, in large Quantities, not only ſobb the Fibres, and looſen the *Craſis* of the Blood, but they waſh off the ſaline and oleaginous Particles from the Blood and Lymph, in great Abundance; and, conſequently, can be proper only for thoſe who live freely upon animal Food, and high-ſeaſoned Sauces. *Secondly*, That the Water in a Cold-Bath, by it's Coldneſs and Gravity, ſhuts the Pores, contracts all the ſubcutaneous Veſſels, ſo that but little Water can paſs through them into the Body; which is very inconſiderable, in Compariſon with the Water that is imbibed through the *Vaſa inhalantia* many Days together in very moiſt Weather of long Continuance: But though the Cold-Bath is very ſafe, and needful in many Caſes, yet People ſhould be more cautious in the Uſe of Bathing in warm Water, and of continuing long in it; eſpecially if their Fibres and Veſſels are lax; and their Fluids too thin.

341. From what has been obſerved in the foregoing Sections, we may infer, that it is as requiſite for Perſons to have Fires in their Rooms, when the Weather is too moiſt, for leſſening the Humidity of the circumambient Air, and guarding againſt the ill Effects of it, as it is to have Fires when the Air is very cold.

342. *A moiſt Air*, by being freely admitted into the *Vaſa inhalantia*, may leſſen the Diameters of the perſpiratory Ducts, and hinder Tranſpiration: For as theſe are diſtinct Series of Veſſels, and are reaſonably ſuppoſed to lie parallel to, and cloſe by, each other, it may eaſily be apprehended that when the *inhaling* Veſſels are dilated, and diſtended, by a free Influx of aqueous Particles from the Air, they muſt neceſſarily compreſs the *tranſpiratory* Tubes, and abate the Efflux of perſpirable Matter; *& ſic vice verſa.*

343. Hence it is evident, how very uſeful and advantageous Exerciſe, and proper Means to promote Perſpiration, are to thoſe who live in a moiſt Air; ſince, whilſt they keep

up a due Quantity of Perſpiration, they are in no Danger of the inhaling Veſſels attracting and receiving too much Moiſture. But the Influence which the *Vaſa inhalantia* may have on the tranſpiratory *Tubuli*, and the Advantages and Diſadvantages which may be received by Matter paſſing into the Body through the abſorbent Veſſels, have not, as yet, been animadverted, ſo much as they ſeem to deſerve.

344. From what has been ſaid it is manifeſt, that *foul Weather*, and a *cloudy Day*, is a Diſeaſe alone. It is within the Compaſs of every one's Obſervation, how languid, dull, and heavy, we are in foggy, moiſt Weather, when the aqueous Vapours hang upon the Surfaces of our Bodies, and inſinuate themſelves into the animal Fluids, whereby they relax the Veſſels, and obſtruct Perſpiration; and how lively and agile we are in a clear, fine, ſerene Air, where the perſpirable Matter flies freely off, and the Veſſels are properly emptied, and reſtored to their due Tone and Elaſticity.

345. The Body, therefore, may properly be ſaid to be ſometimes in a State of imbibing, and ſometimes in a State of caſting out; or, in other Words, the Body will grow

heavier or lighter, in Proportion to the Moiſture or Dryneſs of the Air, and the Quantity of perſpirable Matter thrown out of the Body: * For the Quantity of perſpired Matter found by Ponderation, is only the Difference between that and the watery Particles imbibed from the Air; ſo that after great Labour and Abſtinence, which produce a Vacuity, and a great Diminution of Perſpiration, it is poſſible that the Quantity abſorbed, may exceed the perſpired Matter.

346. *Secondly, A Diminution of the atmoſpherical Preſſure* may be an *Antecedent* to the Diſtemper we are treating of: For when the Gravity of the Air is too little, or it's Preſſure on the external Superfices of our Bodies, is too much abated, the internal Air, or that which is contained in the Veſſels, will, by it's conſtant *Niſus* to unbend itſelf, expand *quaquaverſum*, and thereby greatly dilate the Veſſels, ſo as to create general Uneaſineſſes, as *Yawning*, *Stretching*, and the like.

347. Hence it is eaſy to apprehend why your *Valetudinarians* complain of a Laſſitude and great Wearineſs before Rain, or windy Weather, *viz.* becauſe their Veſſels

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* Vide *Arbuthnot* of *Air.*

are relaxed and dilated for Want of the uſual Preſſure from the circumambient Air; and their Fluids are rarefied and expanded more than ordinary, by the Spring of the included Air; and this, in very weak People, is ſometimes carried ſo far, as to give great Reſiſtance to the Circulation, and to ſtretch the nervous *Fibrillæ* to that Degree, as to cauſe the Senſation of Pain.

348. It is well known that Air is a very elaſtic Body, always exerting itſelf in Proportion to the Abatement of the incumbent Weight which compreſſes it; ſo that Mr. *Boyle*, as we have remarked above, found, by undoubted Experiments, that the ſame Quantity of Air, by only having the Preſſure of the Atmoſphere taken off, in the pneumatic Engine, and without any adventitious Heat to increaſe it's Spring, would poſſeſs above *thirteen Thouſand* Times it's natural Space or Dimenſions.

349. Hence we may plainly perceive, that a Diminution of the atmoſpherical Preſſure may retard the Celerity of the Circulation; the Lungs will be more weakly inflated; the Chyle will not be properly aſſimilated; the Globules of Blood and Lymph will coaleſce, ſo as to paſs with Difficulty

through the remoteſt and minuteſt Veſſels; and conſequently the Secretions and Excretions will be deficient at ſuch Times: Hence the Quantity of animal Fluids will be augmented, and many morbific Particles retained in the Habit, which ought to have been excreted.

350. *Thirdly, Hot, ſultry Air* may cauſe a Laxity of the Veſſels: For though we have remarked, §. xv. that if the Air be hot and dry, and continues ſo long, it will render the Fibres rigid and ſtiff, by exhaling the watery, humid Particles from the external Superficies of the Body, and the internal Superficies of the Lungs; yet it muſt be confeſſed, that all Bodies, even the moſt ſolid, are dilated and rarefied by Heat, the conſtituent Particles acquiring a Sort of repellent Force by the Action of Fire, in Virtue whereof, they endeavour to recede from each other, with a Tendency contrary to that of Attraction. Hence it is, that every Fibre in an animal Body is ſoftened and expanded, and conſequently it's Elaſticity is diminiſhed by Heat, unleſs it be very extreme, and continues ſo long, as to deprive the Fibres of a ſufficient Quantity of Moiſture.

351. If we reflect on the Alterations which may happen in the Blood and Hu-

mours, by Means of warm Weather, it will appear that the fineſt, moſt ſubtile, fluid Part may be evaporated in too great Quantities, whereby the remaining Maſs may become more denſe, viſcid, and glutinous; and Corpuſcles may be formed too bulky to paſs freely through the decreaſing Series of Veſſels.

352. *Fourthly*, *Cold Weather* immediately ſucceeding hot, will hinder Perſpiration, and bring on *intermitting Fevers*, or *Agues*; as is evident from their being ſo common about *Autumn*; and from an old Obſervation, *viz.* That whenever theſe Fevers are *epidemical*, the Wind is *Eaſt*, or *North-Eaſt*, a great Part of that Time.

353. *Cold Air* is replete with nitrous Salts, which may ſtop or hinder Perſpiration, either by condenſing the perſpirable Matter, and rendering it too groſs to fly off through the excretory Ducts of the miliary Glands; or elſe by ſtimulating the Veſſels, and over-contracting the Pores. Or, if we ſuppoſe the nitrous Particles to be imbibed too plentifully by the *Vaſa inhalantia*, it is eaſy to apprehend that they may abate the vital Heat, retard the Circulation, diſpoſe the Blood to be thick and grumous, and conſequently they may diminiſh the *Secretions* and *Excretions*.

354. Hence we may plainly perceive, that though there is ſuch vaſt Difference between the Action and Influence of *Heat* and *Cold*, yet it may poſſibly happen that the ſame Diſeaſe may reſult from either of them. By the *former*, the Fibres may be relaxed, and in Conſequence of that, the Fluids may become groſs and viſcous, and Obſtructions may be generated in the minuteſt *Tubuli*. By the *latter*, the ſeveral Orders of Globules in the Blood and Lymph may be condenſed, and compacted; in Conſequence of which, the Secretions are diminiſhed, and the Solids depreſſed beneath their natural Balance: Both which tantamount to the ſame Thing, and will produce the ſame *Phænomena*, though brought on by different Cauſes, and began by different Means.

355. *Fifthly, Too much Reſt or Inactivity* muſt not be omitted in enumerating the *Antecedents* to this Diſeaſe; on Account of it's rendering the Fibres ſupple and flaccid, and permitting them, and their Interſtices to be laden and ſtuffed with groſs, viſcid Matter.

356. The vaſt Difference to be obſerved between the Strength of active, ſtirring Perſons, and thoſe whoſe Inclinations and Conditions indulge them in Eaſe and Slothfulneſs,

neſs, is enough to convince the moſt unſkilful of the great Uſe and Neceſſity of muſcular Action; in Order to clear, and keep the animal Machine free from Incumberances. The exceſſive Strength ſome Men gradually acquire by a conſtant Practice of vehement Exerciſe, began whilſt they were young, is illuſtrated ſufficiently by the brawny Muſcles of *Porters*, *Plowmen*, &c.

357. Hence, though the Contexture of an animal Fibre be very delicate and tender, yet it improves by Exerciſe; and by Motion and Agitation becomes ſtronger, healthier, and more durable. Moderate Exerciſe not only prevents any ſlimy, mucous Matter from lodging in the Interſtices, or adhering to the internal Surfaces of the Veſſels, and caſts forth the ſuperabundant phlegmy, watery Parts, which only ſerve to ſob and malax the Fibres; but it makes Room for the Appoſition of new, ſolid, nutritive Matter, into the Ruptures, or open vacant Places which may happen in the Fibres; whereby they gain freſh Strength and Springineſs.

358. If to theſe Conſiderations we add, that by Exerciſe, the Circulation of the Blood and Lymph is promoted, Perſpiration and all the Secretions are forwarded, the Blood

and Juices are preſerved in a due State of Fluidity, their Viſcidity broken and diſſolved, and all Obſtructions hindered or removed; we may readily conceive the bad Effects of a ſupine, luxurious Courſe of Life, whereby the Habit is ſtuffed with groſs Humours, the Body oftentimes grows to an enormous Size, the Fibres are enervated, and the Juices are thickened, and diſpoſed to depoſite a ſlimy *Lentor* on the ſides of the capillary, ſanguine, and lymphatic Arteries, and the Orifices of the ſecretory and excretory Ducts.

359. *Sixthly*, The Solids may be relaxed, the Juices impoveriſhed, and a *Lentor* produced in the Blood, by *living too low*, or *upon Food of too little Nouriſhment, or too hard of Digeſtion*; wherein may be included all *acid*, or *unripe Fruits*, *Melons*, *Cucumbers*, &c. on one Side; and all *viſcid*, *tough*, *glutinous Aliment* on the other. Theſe Things, if continued long, or eaten in too great Quantities, will vitiate the animal Fluids, by ſupplying them with Particles unfit to be aſſimilated into Nouriſhment, or ſuch as are too groſs and bulky to paſs freely through the capillary Veſſels.

360. A Laxity and Weakneſs of the Fibres and Veſſels may proceed from too great

a Quantity of *oleaginous* or *pinguedinous* Particles adhering to them; which weaken the Coheſion of their conſtitutive Parts, and abate their contractile Force: Hence eating too much *Fat*, *Butter*, *Oil*, &c. may ſob, incumber, and relax the whole vaſcular Syſtem.

361. *Seventhly*, *Profuſe Hæmorrhages*, *Diarrhœas*, or any large Evacuations from the Blood and Lymph, will drain the Veſſels, relax the Fibres, and diſpoſe the remaining Juices to be viſcid and ill-conditioned.

362. Hence frequent *Bleeding* and *Purging*, by Way of Prevention, are moſt abſurd Cuſtoms, and oftentimes bring on Diſeaſes, inſtead of confirming Health. And it ſeems as unreaſonable to me, that a Man who is perfectly well, ſhould bleed and purge every *Spring* and *Fall*, to prevent Diſeaſes, as one who ſhould alter the chief Springs and Movements of his Watch, in Order to make it go better, or continue to go right, which went perfectly ſo before.

363. *Preventive Phyſic*, therefore, is not to be tampered with, ſince all Evacuations make too great a Change and Alteration in the Conſtitution to be uſed indifferently. If there be no real *Plethora*, they muſt neceſſarily rebate the vital Vigour of the Body,

by decreaſing the Quantity of Fluids which were not in too great Proportion before; by retarding the Celerity of the Circulation; by abating the Heat; by relaxing the Veſſels; by inducing a Viſcidity and Thickneſs in the Humours; and by diminiſhing the ſeveral Secretions.

364. It is well known, that *Bleeding* and *Purging* are very apt to occaſion the Return of *Intermittents,* after they have been cured by the *Cortex,* &c. ſo that conſequently, we may with good Reaſon reckon them, if unadviſedly ordered, where there is no real *Plethora,* where the *Primæ Viæ* are free and clear, and where all the *Viſcera* are ſound, as *prediſpoſing Cauſes.*

365. *Eighthly,* and to conclude this Chapter; From what has been ſaid, and from the moſt diligent Obſervation of the *Phænomena* of *Intermittents,* I think it evident that the conſtant and common Cauſe of this Diſeaſe, is a Diminution of the due Force and Elaſticity of the Solids, whereby the ſeveral Humours of the Body are leſs agitated; and upon this Retardation of their Motion, ſome of their component Globules aggregate and unite into *Moleculæ* too big to paſs freely through the decreaſing Series

of Veſſels; viſcid *Striæ* are left upon the Sides of the capillary Tubes; many of the ſecretory and excretory Ducts are bunged up; Perſpiration is obſtructed; and the Blood is accumulated in the larger and more pervious Veſſels; from whence, as we ſhall ſhew in the next Chapter, ariſes a *Paroxyſm* of a Fever.

CHAP. V.

Of the Riſe *of the moſt uſual* Symptoms *incident to an* Intermitting FEVER.

366. UPON a Review of what has been ſaid in the preceding Chapter, it manifeſtly appears, that all the *Antecedents* to this Diſeaſe are diſpoſed to unbend the Spring of the Fibres, to create a viſcid Blood and Lymph, to retard the Circulation through the capillary, ſanguine, and lymphatic Arteries, and to foul or obſtruct the ſecretory and excretory Ducts.

367. Hence the firſt *Phænomena* that appear, are a *Blueneſs* or *Lividneſs* of the *Hands* and *Nails*, attended with a *Rigor* or *cold Chills*, which ſometimes are ſo violent as to

ſhake the whole Body. The *Pulſe* are *low* and *ſlow*; the *Fleſh* feels *cold* and *flaggy*; the *Countenance* is *pale*; *ſick Fits* ariſe, and *vomiting*; there is a general *Laſſitude* and *Uneaſineſs* all over the Body, with *Yawning*, *Stretching*, and, moſt Times, exquiſite *Pains*, either in the *Limbs*, *Head*, or *Back*.

391. That all theſe Symptoms do ariſe from a groſs, viſcid State of the Blood and Lymph, whereby their Motion is greatly retarded, the Tenſion and Elaſticity of the Fibres are relaxed and weakened, and the ultimate Branches of the *Arteriolæ* are clogged and laden with glutinous Matter; may eaſily be apprehended by thoſe who conſider the Body as a Machine compoſed of an infinite Number of Organs, through which ſome Fluid or other is continually flowing; and that the vital Vigour, natural Heat, regular Pulſe, healthy Complexion, and Eaſe of the Body, intirely depend upon a certain Degree of protruſive Force in the ſeveral Series of Veſſels, and an equable Reſiſtance from the Fluids; whereby the *Craſis* of the Blood is preſerved from being too thick or too thin, the ſecretory and excretory Veſſels are kept patent and pervious, and the

Tone of the Fibres is neither above nor below a healthful Standard.

369. But when the *Vis Vitæ* is decayed and weakened, by an Abuſe of ſome of the *Non-Naturals*, &c. when the Velocity of the Circulation is greatly rebated, the ſeveral Orders of Globules both in the Blood and Lymph will coaleſce and form Corpuſcles too bulky to paſs freely through the capillary Veſſels; eſpecially in the Extremities and external Superficies of the Body, where the progreſſive Motion of the Blood is ſloweſt, as being fartheſt from the Heart. Hence,

370. I. The *Hands* and *Nails* look *black* and *blue*, by Reaſon the Circulation of the Blood is ſlower there, than in any other Part of the Body nearer the Heart.

371. II. *Cold Chills* ſeize the Body for Want of ſufficient Agitation in the Fluids to excite the uſual Degree of Heat.

372. III. The *Pulſe* are *low* and *ſlow* from a Laxity of the whole vaſcular Syſtem, and a Glewineſs of the Blood and Lymph; whereby the impulſive Force of the Fibres is too weak, and the Friction, or *Vis inertiæ* of the Fluids is too great, to be circulated with the ſame Rapidity as uſual.

373. IV. The *Flabbineſs of the Fleſh, pale Looks,* and *Languor,* all manifeſtly proceed from a Deficiency of animal Spirits, and Want of due Force in the Veſſels to attenuate the Blood ſufficiently for a free Courſe through the minuteſt *Tubuli.*

374. V. *Uneaſineſs* and *Pains* ariſe from the capillary Veſſels being ſtuffed with viſcid, glutinous Matter, which retards the Circulation of the Blood and Lymph through them; in Conſequence of which, the *Arteriolæ* are expanded beyond their uſual Stretch, and Pains or Uneaſineſſes are excited in Proportion to the Diſtenſion of the nervous *Fibrillæ,* which help to conſtitute the arterial Tubes.

375. VI. *Sick-Fits* and *Vomitings* proceed from too great a quantity of *Bile,* and heavy, glutinous *Pituit* being thrown into the *firſt Paſſages,* by Reaſon of the Relaxation of the *bilious* and *pancreatic* Ducts, and the Glands of the *Stomach.* The cold, viſcid Phlegm, which is caſt into the Stomach, firſt of all occaſions Sickneſs, that brings on Reachings to vomit, and thoſe invert the Motion of the *Duodenum*; whence the Bile and Pituit are oftentimes brought up in vaſt Quantities.

376. Thus the Symptoms continue till the Obſtructions are multiplied in the Capillaries, ſo as to accumulate the Blood in the larger Veſſels, and to ſhorten it's Circle; in Conſequence of which, a new Set of Symptoms will make their Appearance; For on the ceaſing of the *cold Chills*, &c. immediately ſucceeds a *great Heat*, diffuſing itſelf all over the Body, with *a full, ſtrong, quick Pulſe, a difficult Reſpiration, violent Head-ach, Thirſt, Watchings, Deliria*, and all the uſual *Phænomena* of a *Continuent*. But as there is all the Reaſon in the World to conclude, from Appearances, that theſe Symptoms proceed from much the ſame Cauſes with thoſe of a *Continuent*; and as they have already been accounted for in their proper Chapter, it would be impoſing on the *Reader* to explain them here again. Proceed we, therefore, in the next Place, to a *Statical Examination of the Blood in intermitting, quotidian, tertian, and quartan Fevers*, in Order to illuſtrate their Cauſes and to examine whether their different Periods may not depend upon a preceding greater Viſcoſity of the Blood in one, than in the other.

A Statical *Examination of the* Blood *in an intermitting* Quotidian *Fever.*

The Age *of the* Perſon.	*The Day of the* Diſeaſe	*The Quantity of* Blood *taken away*	*The Quantity of* Serum.	*The Colour and Taſte of the* Serum.	*The colour and Conſiſtence of the* Cruor.
A Man aged 25.	4th	℥xij, ʒj.	℥iij, ℈ij.	Bilious and more pungent than uſual.	Of a vivid red. Degrees of Coheſion 32.
A young Man aged 19.	6th.	℥viij, ℈j.	℥ij, ʒiiij.	Pale and inſipid.	Of a healthy Colour. Deg. of Coheſion 18.
A Man aged 36	3d.	℥x, ʒij, gr. xv.	℥ij, ʒv.	A bright yellow, and pungent.	Exceedingly florid. Deg. of Coheſion 38.
A Woman aged 28	3d.	℥ix, ʒiiij, ℈j.	℥ij, ʒvj, gr. xij.	Of a good Colour and Taſte.	A vivid red. Deg. of Coheſion 24.
A Man aged 42.	5th.	℥xiij, ʒj, ℈ij.	℥iij, ʒiiij, gr. xvij.	Very yellow, and pungent.	Florid, with a little Film upon it. Deg. of Coheſion 33.
A Man aged 22	2d.	℥xj, gr. xxxvj.	℥iij, ʒj, ℈j.	Pale, limpid, and but little Taſte.	A coarſe red. Deg. of Coheſion 21.
A Man aged 38	6th.	℥x, ℈j.	℥ij, ʒiiij, ℈ij.	Flammeous, and pungent.	Of a delicate red. Deg. of Coheſion 42.
A Woman aged 34	2d.	℥viij, ʒiij, gr. xiij.	℥ij, ʒiij, gr. xviij.	Thick, chylous, and ſweetiſh	Pretty florid. Deg. of Coheſion 23.
A Man aged 36	1ſt.	℥x, ʒj, gr. ix.	℥iij, ℈j.	Limpid, pale, and inſipid.	Of a lively red. Deg. of Coheſion 17.
A Woman aged 23.	4th.	℥viij, ʒiiij.	℥ij, ʒv, ℈j.	Pale, and inſipid.	Coarſe and bluiſh. Deg. of Coheſion 20.
A Man aged 29.	3d.	℥ix, ʒvj, ℈j.	℥iij.	A bright yellow, and very ſaline.	A good Colour. Deg. of Coheſion 19.
A Man aged 24.	2d.	℥x, ʒij, ℈ij.	℥ij, ʒj, gr. xlvj.	Straw-coloured, and pungent.	Of a beautiful red. Deg. of Coheſion 36.

A Statical *Examination of the* Blood *in an intermitting* Tertian *Fever.*

The Age *of the* Perſon.	*The Day of* theDiſeaſe.	*The Quantity of* Blood *taken away.*	*The Quantity of* Serum.	*The Colour and Taſte of the* Serum.	*The Colour and Conſiſtence of the* Cruor.
A Youth aged 16.	3d.	℥ vj, ℈ ij.	℥ ij, gr. xv.	Pale and inſipid.	Very bright red. Deg. of Coheſion 16.
A Woman aged 34.	6th.	℥ xij, ʒ j.	℥ iij, ʒ iiij, ℈ j.	Bilious and pungent.	Of a good Colour. Deg. of Coheſion 23.
A Man aged 26.	4th.	℥ x, ʒ ij, gr. xxxv.	℥ iij, ʒ j, gr. xxvj.	Straw-coloured, and well taſted.	Very florid. Deg. of Coheſion 25.
A Woman aged 32	2d.	℥ viiij, ʒ iij, gr. xvj.	℥ ij, ʒ iiij.	Pale and inſipid.	A coarſe red. Deg. of Coheſion 32.
A Man aged 28.	3d.	℥ ix, ʒ vj, ℈ ij.	℥ ij, ʒ ij, gr. xxxvj.	Very yellow, and pungent.	A thin, blueiſh Coat a-top. Deg. of Coheſion 34.
A Man aged 46.	6th	℥ x, ʒ iij, gr. xij.	℥ iij, ʒ iiij, ℈ ij,	Of a Straw-colour, and pretty ſaline.	A delicate red. Deg. of Coheſion 26.
A Man aged 24.	5th.	℥ x, ʒ j, ℈ j.	ʒ ij, ʒ vj, gr. xxviij.	Yellow, and pungent.	Healthy Colour. Deg. of Coheſion 17.
A Man aged 38.	4th.	℥ xij, gr. xviij.	℥ iiij, gr. xxvj.	Pale, viſcous, and inſipid.	A pale red. Deg. of Coheſion 19.
A Woman aged 25.	1ſt.	℥ viij, ʒ ij.	℥ ij, ʒ v, ℈ ij.	Milky, and ſweetiſh.	A weak red. Deg. of Coheſion 24.
A Woman aged 29.	3d.	℥ ix, ℈ ij.	℥ iij, ʒ j, gr. xiiij.	Pale, and inſipid.	A duſky red. Deg. of Coheſion 16.
A Man aged 25.	2d.	℥ x, gr. xxv.	℥ iij, ʒ iij, ℈ j.	Bilious and pungent.	Very florid. Deg. of Coheſion 26.
A Man aged 37.	4th.	℥ xj, ʒ iiij, ℈ j.	℥ iiij, ʒ j, gr. xxxviij.	Limpid, pale, and but little Taſte.	A vivid red. Deg. of Coheſion 28.

A Statical

A Statical *Examination of the* Blood *in an intermitting* Quartan *Fever.*

The Age *of the* Perſon.	*The Day of the* Diſeaſe.	*The Quantity of* Blood *taken away.*	*The Quantity of* Serum.	*The Colour and Taſte of the* Serum.	*The Colour and Conſiſtence of the* Cruor.
A Woman aged 28.	4th.	℥viij, ʒij.	℥iij, ℈j.	Pale, viſcous, and inſipid.	Of a faint red. Degrees of Coheſion 19.
A Man aged 26.	9th.	ʒvj, gr. xviij.	℥ij, ʒij, gr. xxxviij.	Of a weak yellow, and brackiſh.	A coarſe red. Deg. of Coheſion 14.
A Man aged 23.	6th.	℥viij, ʒiij, ℈j.	℥iij, ʒij, gr. xxx.	Whey-coloured, and inſipid.	A pale red. Deg. of Coheſion 11.
A Man aged 37.	1ſt.	℥x, ℈ij.	℥iiij, ʒj, ℈ij.	Straw-coloured, and pretty brackiſh.	Of a good Colour. Deg. of Coheſion 16.
A Man aged 28.	12th	℥viij, ʒiiij, gr. xv.	℥v, gr. xviij.	Pale, viſcous, and inſipid.	A very pale red. Deg. of Coheſion 9.
A Woman aged 22.	5th.	℥viij, ʒj, ℈j.	℥iij, gr. xlviij.	Limpid, clear, and inſipid.	A coarſe red. Deg. of Coheſion 22.
A young Woman aged 17.	1ſt.	℥vij, gr. xxv.	℥ij, ʒvj, gr. xvj.	Straw-coloured, and brackiſh.	A vivid red. Deg. of Coheſion 25.
A Man aged 24.	1ſt.	℥x, ʒj, gr. xv.	℥iij, ʒiiij, gr. xxxviij.	A good Colour, and common Taſte.	A pale red. Deg. of Coheſion 18.
A Man aged 36.	18th	℥vj, ℈j.	℥iij, ʒij, gr. xij.	Pale and inſipid.	A very pale red. Deg. of Coheſion 12.
A Man aged 25.	1ſt.	℥viij, ʒij, gr. x.	℥ij, ʒv, ℈ij.	Yellow, and brackiſh	Pretty florid. Deg. of Coheſion 26.

377. Hence we have evident Demonſtration of the Viſcidity and Glewineſs of the Blood in *Intermittents*; and that the red Globules bear a greater Proportion than is conſiſtent with Health: Whence we may reaſonably conclude, that what has been ſaid concerning the capillary, ſanguine, and lymphatic Arteries being fouled, laden, and many of them quite bunged up, by the adheſion of ſome ſizy, viſcid, glutinous Matter to their Sides, is perfectly true, and is the immediate Cauſe of every *Fit* or *Paroxyſm*.

378. From theſe Experiments we may obſerve, that the *Craſſamentum* is not ſo viſcous and tenacious, neither is the *Serum* ſo bilious, ſaline, and acrid, as in *acute continual Fevers*; and alſo that the red Globules abound more, and the *Cruor* is more viſcid or tough in *Quotidians* than in *Tertians*, and in *Tertians* than in *Quartans*: And may not this, therefore, be the chief Reaſon why the *Paroxyſm* of the Fever is generally more ſevere in *Quotidians*, than in *Tertians*, and in *Tertians* than in *Quartans*?

379. Experience hath ſufficiently taught us, that exhibiting hot, acrid, volatile, ſaline, and ſulphureous Medicines, in the *Beginning* of *Quotidians*, or *Tertians*, has oftentimes al-

tered them into *Continuents*; by augmenting the Heat, bracing up the Solids too haſtily, and thereby increaſing the *Lentor*, and confirming the Obſtructions.

380. The *Symptoms*, as we have remarked above, are much the ſame during the *Paroxyſm* of an *Intermittent*, as in a *Continuent*; and the only Reaſon that I can aſſign why the *Fever-Fit* of an *Intermittent* does not continue longer, or laſt for many Days, is becauſe the *Lentor*, or morbific Matter which abounds in the Blood and Lymph, and which lodges in, or adheres to, the ultimate Branches of the ſanguine and lymphatic Veſſels, ſo as to obſtruct the Circulation through them, and to cauſe a Redundancy of Blood in the larger Arteries, is not ſo compact, nor coheres ſo ſtrongly to the Veſſels, as it doth in *ardent continual Fevers*: For which Reaſon the additional *Momentum* of the Blood, by Means of a *Fever-Fit*, does ſoon diſlodge, diſſolve, and attenuate the morbid Matter fit for Excretion, by *Sweat*, *Urine*, &c.

381. That the Obſtructions are perfectly removed, and the febrile Matter excreted, or, at leaſt, ground and comminuted fine enough to paſs freely through the minuteſt *Tubuli*, without Stagnation or Obſtruction,

is evident from the Abatement of all the feveriſh Symptoms, and the Eaſe which the Patient feels immediately after a *profuſe Sweat*, and diſcharging a Deal of *turbid Urine.*

382. I have ſeveral Times *analyſed* the *Urine* which was made juſt before, and immediately after the *Paroxyſm* of an *Intermittent*; and always found that the Urine which was made at the *Criſis*, was vaſtly more laden with *ſaline* and *ſulphureous* Contents, than that which was made before, or in the Fit: Whence it ſeems to me that the *Criſis* of every *Paroxyſm* of an *Intermittent*, is as perfect, as that of a *Continuent.*

383. Thus much may be ſufficient to account for a ſingle *Paroxyſm*, or *Fit* of an *Intermittent*; but that which is moſt perplexing, is, to give a rational Account of the Cauſe of it's *Periods*, and why it returns at ſuch and ſuch ſtated Times.

384. In order, therefore, to inquire into this moſt intricate Affair, we muſt look back, and conſider the *primary* Cauſe of this Diſeaſe; which, as we have proved above, is a *Laxity* of the ſeveral Series of Veſſels, whereby the Circulation of the Blood and Lymph becomes too ſlow, the Humours

grow viſcid and glutinous, the Secretions and Excretions are imperfectly performed, and Matter is retained in the Habit, which ought to have been evacuated. Hence Obſtructions are generated in the capillary Veſſels, the pent-up Matter grows acrid and ſharp, the Blood is accumulated in the more pervious and patent Veſſels, it's Circle is ſhortened, and, conſequently, it's Return to the Heart will be more quick, the Pulſe will be more frequent, the Heat of the Body will be augmented, and a Fever will ſucceed.

385. If we diligently and accurately examine a Patient after the Fit is off, we ſhall find his Pulſe lower, and ſlower, than in a healthful State; he is rather cold and chilly than otherwiſe; and his Muſcles and Skin feel flabby and relaxed: So that though the immediate Cauſe of the Fever is removed, yet the primary, or remote one, ſtill remains, *viz. A Laxity of the whole vaſcular Syſtem.* Hence the Digeſtion muſt neceſſarily be imperfect, the Chyle is ſent into the Blood very groſs and crude, Perſpiration is obſtructed, and morbific Matter, or Corpuſcles, too bulky to paſs freely through the *Arteriolæ*, are generated; and they, by their

Power of Attraction, do aſſimilate more and more, till the *Lentor* is ſufficient to bring on another *Paroxyſm*, and that in a determinate Time, either *every Day*, or every *other Day*, or every *third Day*, according to the different Degrees of Laxity in the *Solids*, and the aſſimilating Power in the *Fluids*.

386. From the *ſtatical Experiments* above, it appears, that in *quartan Agues*, the Blood is moſt of all depauperated, and the red Globules are broken down; whence it ſeems reaſonable to conclude, that it requires a longer Time to aſſimilate the Particles of the animal Fluids, and to produce a *Lentor* ſufficient to bring on a *Fit of a Fever*, when the Veſſels are moſt lax, and the Circulation is ſloweſt: And that the Fibres are moſt lax, and that the Motion of the Blood is ſlower between the Fits of a *quartan Ague*, than it is between thoſe of *tertian* or *quotidian*, is manifeſt to every experienced Perſon.

387. That this, plain as it is, is the true Reaſon of the Difference of the *Periods* in *quotidian*, *tertian*, and *quartan Fevers*, may more obviouſly appear by obſerving how common it is for a *Quotidian* to decline into a *Tertian*, and a *Tertian* into a *Quartan*, after they have laſted ſome Time, and the

Veſſels grow more lax, and the Humours are more and more depauperated.

388. If we conſider the Conſequences of ſuffering *intermitting Fevers* or *Agues* to remain long, they may alſo ſerve to illuſtrate what has been ſaid: For Experience ſufficiently teſtifies, that the *Liver*, *Spleen*, *meſeraic Veſſels*, *Glandules of the Inteſtines*, and many other Paſſages, are liable to be fouled and obſtructed by the morbific Remainders of *quartan Agues*, which commonly leave *Obſtructions* of the *lower Belly* behind them, with *hard*, *knotty*, *ſcirrhous Glands*. Hence the *Jaundice*, *Cachexy*, *Dropſy*, &c. are no unuſual Conſequents of an *Intermittent* of long Continuance: Which further ſhews, how far the Tone, Vigour, and Elaſticity of the Fibres are decayed, and how much the Temperature of the Humours, and the *Craſis* of the Blood, are ſpoiled and deſtroyed.

389. I ſhall conclude this Chapter with obſerving, that if the Fever returns every Day, it is called an *intermitting Quotidian*; if every other Day, a *Tertian*; and if every third Day, a *Quartan*. When the Fit returns at regular and ſtated Times, it is called a *periodical Intermittent*; but when the

Returns are not regular, or at certain Periods, but happen ſooner or later, before or after the Time expected, it is called an *erratic Intermittent.* There are many other Diviſions and Subdiviſions of this Diſeaſe made by ſome Authors; but as they ſerve chiefly to confuſe the Minds, and to burden the Memories of *young Students*, I chuſe to avoid them.

CHAP. VI.

Of the Cure *of an intermitting* FEVER.

390. IN treating of the *Cure* of this, or any other Diſtemper, the beſt Guides we can take are a cloſe Attention to the *antecedent* Cauſes, and a diligent Obſervation of the *Phænomena*, in the ſame Order they make their Appearances. I ſhall begin, therefore,

391. *Firſt*, with the *cold Fit*, which always, more or leſs, precedes the *hot Fit* of an *intermitting Fever* or *Ague*. Now, though there is ſeldom Occaſion for exhibiting any

Thing for the Removal of this Symptom, becauſe, as the Obſtructions increaſe in the Capillaries, and the Blood is accumulated in the larger Veſſels, the Heat of the Body will neceſſarily be augmented in ſome ſhort Time; yet it ſometimes happens, in confirmed and inveterate *Agues*, and in *old People*, where the *Vis Vitæ* is much decayed, where the Strength, Tone, and Elaſticity of the Fibres are weakened, and where the Fluids are much too grumous and clotty, that the *cold Fit* continues ſome Hours, and ſometimes proves fatal: For it has conſtantly been obſerved, that if a Perſon dies with an *Ague*, he always dies in the *cold Fit*.

392. If the *cold Fit*, therefore, be bad, and threatens Danger, either through the Severity of the Diſeaſe, or the Weakneſs of the Patient, we muſt have immediate Recourſe to warm, cordial, volatile, alexipharmic Medicines, *viz. Rad. Contrayerv. Serpent. Virg. Antim. Diaphor. Sal. Vol. Succin. Camphor. Crocus, Confect. Raleighan. Spt. Corn. Cerv.* &c. mixed, and waſhed down with appropriated Liquors, or Juleps; ſuch as will rouze the drooping Spirits, ſtimulate the Fibres, excite, quicken, and

ſtrengthen their Vibrations, and conſequently accelerate the Motion of the Fluids, attenuate the Humours, and thereby prevent a mortal Coagulation. But as theſe Sort of Medicines are never to be adminiſtered, but where the vital Powers are exceedingly decayed, and where the Blood ſcarce moves on in it's Channels for Want of ſufficient Impulſe; we may eaſily apprehend the bad Effects they will produce, if given to young People, or to thoſe whoſe vital Vigour is but little rebated; we may ſet it down for granted, that they will double the Fit, augment the Heat, and render the Sick delirious and frantic, if not change the Fever into a *Continuent*.

393. A *Draught* or two, therefore, of warm *Sack-Whey* may be all that is neceſſary during the Continuance of the *cold Fit*; or if there be a Tendency towards Vomiting, let it be incouraged with large Draughts of *Chamomile Tea*.

394. *Secondly*, During the *Exercabation*, or *hot Fit*, the chief Indications are to attenuate the *Lentor* obſtructing in the capillary Veſſels; to break, divide, diſſolve the Coheſion of it's Parts, and to make the Blood and Lymph more fluxil.

395. If we conſider with what Power every Part of the animal Machine exerts itſelf during the Continuance of a *Fever-Fit*, in Order to comminute the Humours, and to diſcharge the morbid Matter out of the Habit; and that all this is merely the Reſult of the ſtupendous Frame and Contexture of the Body: I ſay, if we conſider that the ſeveral Organs of the Body are ſo conſtituted that in many Caſes they are able of themſelves to diſcharge the Burthen, and to get rid of the Incumberances; it will ſurely prevent our being too officious, or acting, perhaps, inconſiſtently with the *Conatus* of Nature.

396. Thus in *Intermittents*, where the *Paroxyſms* are light, and where they go off by the Strength of *Nature*, in *profuſe Sweats* and *turbid Urine*, there ſeems to be little or no Occaſion for the *Phyſician* during the Fit; but if any of the Symptoms are violent, and threaten to laſt long, it is then our Duty to aſſiſt Nature, and to endeavour to abſtract from the *Materies Morbi*.

397. And, in the *firſt Place*, if the *Patient* be delirious; if the Pulſe are very full and quick; if ſharp, pungent Pains are fixed in any Part of the Body; and if, by the Man-

ner of Living, or from an undue uſe of any of the *Non-Naturals,* we have good Reaſon to ſuſpect a plethoric Habit, *Bleeding* may be proper to abate the Redundancy of Blood in the large Veſſels, to prevent Inflammations from fixing upon any of the *Viſcera,* and to promote a *Criſis.* But where the Symptoms are not deſperate, where the Pains are neither fixed, nor acute, and where you have no Reaſon to ſuſpect a plethoric State; there drawing away Blood may be detrimental, as it will reduce the vital Strength of the Body, by abſtracting from the Quantity of Blood, which was not too great before, and by leaving the Fibres in a greater Degree of Laxity.

398. *Cooling, diluting Liquors,* however agreeable to the *thirſty Patient,* do not ſeem to be ſo uſeful here as in *continual Fevers:* For ſince the febrile Matter does not adhere ſo firmly to the capillary Veſſels, nor is the Coheſion of it's Parts ſo ſtrong, but what the additional *Momentum* of the Blood, by Means of a *Fever-Fit,* is ſufficient to ſhake, agitate, diſſolve, and remove, in the Space of a few Hours; it ſeems unneceſſary to pour in large Quantities of Liquors, which, however ſmooth, and innocent, will require

ſome Force to aſſimilate them, and by further diſtending and dilating the larger pervious Veſſels, they will aggravate the Symptoms, and prolong the Fit.

399. Whoever will conſult the learned *Lommius* *, will be abundantly ſatisfied in this Matter; who tells us, that during the Continuance of an *intermitting Fever*, all Liquids muſt be as much as poſſible excluded; the Patient, however, droughty, muſt abſtain from them, and be informed that when the Fever goes off, the Thirſt will go likewiſe; and that by drinking, the Fit will run out a greater length; ſo that he who does not drink, will ſooneſt ceaſe to be thirſty. For much Extenuation is neceſſary, that the putrefied and impacted Matter, which ought to go off, may be thrown out; which Extenuation is retarded by a large Quantity of Liquor.

400. *Bliſtering Plaiſters* are very beneficent in *intermitting Fevers*, eſpecially if the Head or Nerves be affected; for ſince the Fibres are too lax, and the Fluids groſs and glutinous, from too ſlow a Motion, their Application can never be attended with Danger.

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* Vide *Treatiſe of Fevers.*

401. *Lenient Clyſters* may be proper where the Body is coſtive; but they ſhould by no Means be repeated often, becauſe a conſtant Drain this Way would retard the *Criſis*, by rendering the Blood more viſcous, and reducing the Power of the Solids.

402. *Mild, diaphoretic Medicines*, ſuch as the *Pulv. e Chel. Canc. comp. Pulv, Purpureus*, or *Lapis Contrayerv.* waſhed down with ſome weak *Sack Whey*, or a Draught of *Barley-Water*, may be very uſeful where the Symptoms are violent, in Order to promote a *breathing Sweat*, and to forward a *Criſis*.

403. Thus much may ſuffice for Directions during the *Paroxyſm* of a regular *Intermittent:* But if one Fit returns before the laſt is perfectly gone off, if there be only a ſhort and ſlight *Remiſſion*, if the Pulſe continue to be too quick and full, and if the Urine does not grow foul, or let fall a laudable Settlement, we are to ſuſpect the Sweats as only ſymptomatical, and that the Fever is what *Bellini* calls a *periodical Continuent*. In ſuch a Caſe we are to continue the Uſe of *mild Diaphoretics* till the febrile Matter is attenuated and made leſs viſcid and glutinous; and as the Fever is near a-kin to a *Continuent*, we may be more free with *cool-*

ing, diluting Drinks, than in a regular *Intermittent*; and, indeed, in moſt Reſpects, we are to behave as though it was an *acute continual Fever*, and above all Things take Care how we exhibit the *Bark* till the Intermiſſion is regular, and laſts ſome Hours, with an even, ſteady Pulſe, and a thick lateritious *Hypoſtaſis* in the Urine.

404. I have ſeldom had Occaſion to repent of treating my Patients after this Manner; but I have often known fatal Effects from exhibiting the *Bark* too ſoon, or where there has been only a *Remiſſion* of the Fever for a few Hours, without an Abatement of the bad Symptoms. And, indeed, if we conſider that the *Viſcera* are laden with a heavy, pituitous, glutinous Matter; that the capillary, ſanguine, and lymphatic Arteries are ſtuffed with ſizy Blood and Lymph; and that neither of theſe Impediments are perfectly removed when there is only a Remiſſion of the Fever; it will evidently appear that the Adminiſtration of the *Bark* muſt neceſſarily be attended with the utmoſt Danger: For to conſtringe the Veſſels, and to leſſen the Diameters of the ſecretory and excretory Ducts, whilſt a *Lentor* is exiſting in the Blood and Lymph, can ſeldom be attended

with Succeſs. Add to this, that it here be the leaſt Suſpicion of an *inflammatory State* of the Blood, the *Cortex* is direct Poiſon. Proceed we now to the *curative Indications* during a regular *Intermiſſion* of a *Fever* or *Ague.*

405. *Firſt,* If we conſider the Laxity of the Fibres, and the Glewineſs of the animal Fluids; that the Stomach is generally laden with a heavy *Pituit,* and the *Primæ Viæ* clogged with a viſcid *Saburra,* it will appear that *Vomits* claim the firſt Place, where there is no inward Injury, or great Weakneſs to forbid them. For as they wonderfully excite ſtrong Vibrations, and contractile Motions in the Solids, they muſt conſequently ſhake, agitate and divide the Fluids, and diſſolve the Band of Union between the ſeveral Orders of Globules which conſtitute a viſcid State of the animal Juices.

406. Experience ſufficiently teaches us, that an *Emetic* given two or three Hours before the Fit, is of ſingular Service, by diſcharging a deal of pituitous, bilious Matter from the firſt Paſſages, and by adding to the *Momentum* of the Blood, ſo as to attenuate the Juices, and to provoke a plentiful Breathing by Perſpiration and Sweat.

407. Hence the judicious *Pitcairn* * highly commends the Uſe of *Vomits*, and prefers them to *Purges*, becauſe the Viſcidity, from whence the Fever has it's Origin, for the moſt Part, has it's Riſe from what is taken in by Way of Diet, and the *Lentor* is derived from the firſt Paſſages: And becauſe Vomits more effectually remove ſuch *Lentor* than Purges, and by the neceſſarily greater and more frequent Contraction of the Stomach and *Abdomen*, preſs out that *Lentor* which adheres to the ſmall Veſſels, in a ſhort Time, which Purges would hardly reach in an Age; and, becauſe Delays are dangerous in a Fever, therefore a Vomit ought always to be timely enough given, for it's Operation to be over before the Return of the Fit; and may be repeated once, and, ſometimes, twice, at a due Diſtance, if there be a Propenſity, or urging to vomit, and if the Make of the Perſon is ſuch, that he can vomit without much Difficulty, and is not ſubject to caſt up, or ſpit Blood.

408. *Secondly*, Though the Preference be here given to *emetic* Medicines, in moſt *intermitting Fevers*, yet we are not to diſcard the *cathartic Tribe*: For where the *Primæ*

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* Vide *Elements of Phyſic.*

Viæ are foul, or where we have Reaſon to ſuſpect glandular Obſtructions in the *Meſentery*, and *Viſcera* of the lower Belly, as it oftentimes happens in obſtinate and inveterate *Agues*; great Care muſt be taken to make proper Evacuations, both by *vomiting* and *Stool*, and to diſlodge thoſe Obſtructions, before we think of adminiſtering the *Bark*: Becauſe if any of the *Viſcera* are unſound, or their complicated Veſſels obſtructed, or the Glandules grown ſcirrhous, ſo that the Fibres have not Room to vibrate or contract with a ſufficient Impulſe; if we endeavour to enforce their Springs before the obſtructing Matter is diſſolved or looſened, the Fibres will only be ſtrained to no Purpoſe, and conſequently weakened: For whenever an Effort is made to remove any Thing by an elaſtic Body, if the firſt Exertion fails, every *Impetus* afterwards languiſhes, and the Spring is ſpoiled.

409. We are not, indeed, to make choice of the moſt active, ſtrong Medicines, becauſe if too much Lymph be drawn from the Blood, the remaining Juices will become more viſcid and glutinous, and conſequently the Diſeaſe will be increaſed; but it ſeems moſt conſonant with Reaſon and

good Practice, to pitch upon ſuch as act rather as *Alteratives*, than ſtrong *Cathartics*, by attenuating the Humours, diſſolving their Coheſions, and diſlodging Obſtructions. Thus the *Pil. Ruſi. Pil. Stomach. cum Gummi, Aloe roſat. with Rhubarb, Calomel,* &c. ſuited to the Strength of the Patient, ſo as to purge but little, are of ſingular Advantage, as they are adapted to ſcour the *meſenterial* Glands, and to remove Obſtructions, when they are not immediately ejected by Stool.

410. This, perhaps, may ſeem a *Paradox* to ſome People, *viz.* That when theſe Sort of Medicines purge but little, they ſcour the *meſeraic* Veſſels moſt: But the Truth of it may eaſily be apprehended, if we reflect on the infinite Number of abſorbent Veſſels which are ſituated all along the inteſtinal Tube; in Conſequence of which, theſe Medicines do paſs from the Inteſtines into the Blood, and when they are ſecreted by the *Liver, Spleen, Pancreas*, or *meſenterial Glands*, and brought back again into the inteſtinal Tube, they may, for the ſame Reaſon, if they are not hurried along by a vaſt Flow of Humours, enter the *Vaſa abſorbentia* a *ſecond* Time, and ſo on a *third*, and *fourth*; before they happen to be diſcharged

from the Body. Whereas the moſt active and ſtrongeſt purging Medicines occaſion ſuch a vaſt Flux of Humours into the Bowels, that they are immediately, as it were, diſcharged; and conſequently cannot be ſuppoſed to be ſerviceable in the preſent Caſe, by Reaſon they have not the Opportunity of attenuating the morbid Matter, lodged in the *Viſcera*; but, on the contrary, they leave it more tenacious and adheſive, by draining away the moſt fluid Parts of the Lymph.

411. But as a happy Succeſs in the Cure of Diſeaſes, is the beſt Teſtimony of the Truth of the Theory we ground our Method of Practice upon; I can truely affirm, that in long continued *Agues*, or *intermitting Fevers*, which have baffled the *Bark*, and many other Medicines, I have met with more Advantage from *Rhubarb* and *Calomel*, exhibited in ſmall Doſes, than from any other Medicines I ever tried. But to proceed;

412. *Thirdly*, Proper Evacuations being made, according to the Urgency of the Caſe, the next general *Indication of Cure* is to grind, dilute and diſſolve the whole Maſs of Fluids to a proper Degree of Softneſs, Smoothneſs, and Fluidity; to reſolve the Obſtructions generated by Viſcidity and

Glewineſs; to render the Circulation free and eaſy; and to make all the Secretions and Excretions flow in their due Proportion and Order, by reſtoring a proper Tone and Force to the whole vaſcular Syſtem.

413. Now whatſover is to be effected by bracing the Fibres, and invigorating their Vibrations, is with Certainty to be had from the *Cortex*, which now-a-days is boldly adminiſtered; and were it's Effects as durable as they are ſudden and ſurpriſing, it would doubtleſs deſerve the firſt Place among all Medicines yet known: But there ſeems to be wanting, in obſtinate and confirmed *Intermittents*, ſomething that is more ſtrongly endued with a Property of attenuating and diſſolving the viſcid Coheſions in the Blood and Lymph: For though it is certain that ſuch Things as conſtringe the Veſſels, in any Degree, do alſo proportionally increaſe the Force of the arterial Blood, and thereby invigorate the Animal; and when the Blood is more forcibly impelled through the ſmaller capillary Veſſels, it will thereby acquire a greater Degree of Heat, and be alſo more attenuated and digeſted; yet daily Experience informs us, that the *Cortex* is not

ſelf-ſufficient to cure many inveterate and confirmed *Intermittents* or *Agues.*

414. The *Modern Practice* therefore, of joining *Rhubarb* with the *Bark*, is an excellent Method, in groſs and plethoric Habits, or where there is the leaſt Suſpicion of the *Liver*, *Spleen*, *meſeraic Veſſels*, &c. being fouled or obſtructed.

415. The *alkaline Salts* alſo are, in many Caſes, advantageouſly preſcribed either by themſelves, or in Conjunction with the *Bark:* For as they gently ſtimulate the Solids, attenuate the Juices, and reſolve the coagulated Humours; they conſequently muſt be uſeful, as proving deobſtruent and aperitive. *Boerhaave* * aſſures us, that this *Salt* is a very powerful Medicine in ſtubborn *Fevers* or *Tertian Agues.* The Quantity of *three Drachms* thereof, ſays he, being diſſolved in Water, and taken at ſeveral Times, in the Interval of two *Paroxyſms*, will ſeldom fail to cure an obſtinate *Tertian* or *Quartan Ague.* For by it's penetrating and active Virtue, it breaks away all Obſtructions in the Capillaries, and opens a Paſſage for the impacted Matter to eſcape at, through the Glands of the Skin; whereby all the febrile *Lentor* is

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* Vide *New Method of Chemiſtry.*

at length diſſolved, and carried clean out of the Body. But then we muſt be careful to what Perſons we uſe our Remedy; and be well aſſured they are able to undergo the Operation thereof: For it might prove of ill Conſequence to give it to ſuch as are *Phthyſical Hectical*, or labour under any *inflammatory* Diſorder.

416. *Chamomile Flowers, Diaphoretic Antimony, Myrrh, Gentian, Alum and Nutmeg*, &c. have ſometimes been ſucceſsfully adminiſtered; and, indeed, in ſlight *Intermittents*, there are a Thouſand Things, which have, at one Time or other, cured them: But in obſtinate *Quartan Agues*, when they have been of long Continuance, and threaten to degenerate into ſome *chronic* Diſeaſe, we muſt have Recourſe to more powerful Medicines to aſſiſt the *Bark*, and to prevent the Return of the Fever.

417. Here all *volatile, detergent, and ponderous Medicines* are uſeful, eſpecially after the Fever is put off by the *Cortex*, to diſſolve the ſizy Humours, to ſcour the Glands, to add to the *Momentum* of the Blood, to brace up the Fibres, and to amend and reſtore a healthful *Craſis* to all the Humours. I have met with vaſt Succeſs by joining *Camphor*,

phor, Rad. Helleb. nig. Rubig. Ferri, Cinnab. Antim. Æthiops Mineral. &c. with the *Cortex,* in Order to prevent the Return of *Agues.* The whole vaſcular Syſtem is agreeably agitated by the Impulſe of theſe Medicines againſt the Sides of the capillary Veſſels; and the minuteſt Paſſages are forced open by their Subtilty, Weight, and the increaſed Velocity of the circulating Fluids.

418. But in ſuch a Caſe as this, and with ſuch Medicines, it is abſolutely neceſſary to have Recourſe to the Uſe of conſtant and proper *Exerciſe,* which will concur and give energy to them, and be a Means of producing their deſired Effects much ſooner: For whenever the Tone of the Solids is almoſt ſpoiled, when the whole nervous Syſtem is flaccid and relaxed, the moſt wonderful Relief is to be found by a conſtant Courſe of riding on Horſeback; whereby ſo many little, gentle Concuſſions are given to the Body, and particularly to the lower Belly, that the ſeveral Strainers of the Body, as well as the Juices to be ſtrained, are very much affected by it.

419. Hence *Riding* is to be preferred to all other Exerciſes, where the Patient is able to bear it, becauſe you have ſufficient

Motion given to the Body at the leaſt Expence of Spirits; but then it never ſhould be violent, or continued ſo long as to tire; for that would do more Hurt than Good, by waſting the animal Spirits, and leaving the Fibres more lax than they were before.

420. The *Cold Bath*, where Age, or no inward Weakneſs forbid it, is exceedingly proper, eſpecially in the *Summer Seaſon*, to recover the loſt Tone of the Fibres, and to grind and comminute the viſcid, ill-conditioned Juices, and to prevent *catching Cold.*

421. Being curried well with a *Fleſh-Bruſh* opens the Pores, promotes Perſpiration, quickens the torpid Motion of the Blood in the capillary Veſſels, enlivens the Circulation of it's whole Maſs, attenuates the lymphatic Juice, and reſtores the weak, relaxed Fibres to their proper Tone and Elaſticity.

422. A *Removal* from a *cold Air* into a *warm* one, or from a *damp, moiſt, Place* into one that is *dry*, may be of vaſt Advantage; for a good Air, alone, does frequently perform what was, in vain, expected from *Phyſic.* He who duly conſiders what has been ſaid above, concerning the *antecedent Cauſes*

of this Diſeaſe, will be at no Loſs to apprehend the Truth of this.

423. The *Aliment* proper for Perſons of weak, relaxed Fibres, is ſuch as requires the leaſt Force to digeſt, and convert it into animal Subſtances. *Milk, Eggs, Broth, Chickens, Veal, Lamb, Mutton,* &c. are generally eaſy of Digeſtion and Aſſimilation; but all *ſalted, acid, viſcid, glutinous Food* is to be avoided, becauſe it will produce a coarſe Chyle, Particles may get into the Blood too bulky to paſs freely through the minuteſt *Tubuli,* Nutrition will be imperfect, the moſt fluid Secretions may be diminiſhed, the Fibres more and more relaxed, and Obſtructions may be generated in the ultimate Series of Veſſels, for want of Power to comminute, and puſh forward their contained Juices.

424. *Drinks* proper for People ſubject to this Diſeaſe, are *ſtrong, auſtere, red Wines,* diluted with *Spaw, Pyrmont,* or ſome other *chalybeat Water*; or if theſe are thought too forcible for ſome weak and delicate Conſtitutions, *fine Spring-Water* may be uſed in their ſtead. All *Malt-Liquor* is pernicious, as it is of a viſcous and glutinous Quality, and requires great Strength to aſſimilate into Nouriſhment, or convey it out of the Body.

425. Thus it appears of what ſingular Advantage an exact Obſervance of the *Non-Naturals* is, towards the Cure of this Diſtemper; and I dare pronounce, that more People fail in their Cure, and more Fevers return after they have been put off by the *Bark*, &c. for Want of due Care in theſe Things, than from any other Means whatſoever.

CHAP. VII.

Of the Antecedents *to a* hectic FEVER.

426. THE *prediſpoſing* or *procatartic* Cauſes of *hectic Fevers*, are, *firſt*, more than ordinary Evacuations by *Sweat*, *Urine*, *Stool*, *immoderate Fluxes of the Menſes*, *Fluor albus*, *Hæmorrhages*, *Ulcers*, *or any profuſe Diſcharges from the Blood*; whereby the nutritious Parts run off more abundantly than they can poſſibly be ſupplied by Aliment.

427. It is a received Opinion, that People of thin, ſpare Habits, long Necks, of a deli-

cate Make, whoſe Veins look blue, and almoſt diaphanous, from the Thinneſs of their Coats, whoſe Fleſh feels ſoft, and whoſe Nerves are ſuſceptible of the leaſt Impreſſions, are moſt ſubject to this Diſeaſe: For as the Make and Contexture of their Fibres is extremely neat and fine, ſo they are exceedingly weak and tender, and, conſequently, more liable to be ruffled, and put out of Order, by any Alteration, or a Miſuſe of the *Non-Naturals*.

428. Hence the Viciſſitudes of Seaſons, an Alteration of Climate, a Change of Diet, more than ordinary Sleep, or Watching; too much Exerciſe, or Inactivity; a Retention of any Matter in the Habit which ought to be excreted; or an inordinate Diſcharge from the Blood, and the Paſſions of the Mind, have the greateſt Influence over thoſe whoſe Nerves are weak and tender; and if any of theſe Things are extreme, or continue long, they muſt neceſſarily rebate the vital Vigour of the Body, retard the Circulation, and produce viſcid, ſharp, and ill-conditioned Juices, which, in the End, may ſeize upon ſome of the *Viſcera*, generate Obſtructions, and lay the Foundation of *hectic Fevers*, as we ſhall ſhew hereafter.

429. Experience teaches us, that immoderate Excretions, by any of the Emunctories, are the Effects of lax Fibres, either in general, or in the Part particularly affected. Thus habitual and profuſe Diſcharges by *Sweat*, *Urine, Stool, Menſes, Fluor albus*, &c. are moſt certainly the Conſequents of a Relaxation of the ſecretory and excretory Ducts of the *miliary*, *renal*, and *inteſtinal Glands*, and of the *uterine Veſſels*, &c. Whence we may reaſonably conclude, that though the ſtrongeſt Perſons may, by an Abuſe of the *Non-Naturals*, or by ſome accidental Cauſe, be ſometimes troubled with the above-mentioned exceſſive Diſcharges; yet, before they become habitual, or conſtant, the Tone, Vigour, and contractile Force of the Fibres muſt be greatly decayed, either in Part, or all over the Body. Proceed we, therefore, to inquire after the moſt general *procatartic* Cauſes, whereby the Vigour of the Fibres, even of the ſtrongeſt Perſons, may be reduced, and particular, or general Weakneſſes brought on.

430. *Firſt*, then, *Too free a Uſe of ſtrong, ſpirituous Liquors*, will inevitably deſtroy the Tone of the Solids, and the *Craſis* of the Fluids, by the ſtimulating, and ſtrongly at-

tracting, Power, of acrid, firey, cauſtic, ſaline, and ſulphureous Particles, wherewith they abound. We are aſſured, by many obvious and undoubted Experiments, that ſtrong, ſpirituous Liquors, will coagulate the Blood and Lymph; and though, for a Time, they may ſeem to contract and ſhorten the Fibres, and to give freſh Force and Vigour to them, yet, in the End, they will moſt certainly corrode, abrade, and wear away ſome of their conſtituent Particles, and render them thinner and weaker.

431. Hence the Chearfulneſs, and ſudden glowing Heat, which diſtilled ſpirituous Liquors give to the poor, unhappy, habitual Drinkers thereof, ſoon ceaſe, and end in a cold, relaxed, and languid State; whereby the Sufferings of theſe People become very grievous, becauſe nothing will give them immediate Relief, but the ſame baneful Liquors which were the Foundation of all their Miſeries. This, it muſt be confeſſed, is a moſt deplorable Condition, and requires the utmoſt Reſolution and Courage to conquer: They muſt forego their only Comfort and Delight; they muſt labour under inceſſant ſick Fits, and Vomitings, with the utmoſt Horror and Deſpair; and all theſe,

perhaps, for a long Time, before they can recover the due Tone and Vigour of their Fibres.

432. The firſt Organ that generally is affected, by an habitual Drinking of diſtilled ſpirituous Liquors, is the *Stomach*; whoſe inner, villous Membrane, is abraded, and worn off by them, and thereby it's nervous Coat is expoſed to the rude Inſults of the moſt ſharp, acrid, firey Particles; by which Means the Springineſs or Elaſticity of the Fibres is enfeebled, and the whole Stomach becomes ſoft, flabby, and relaxed. Hence,

I. Ariſes a *Want of Appetite*, and an Inability of digeſting the little that is taken in.

II. From a Weakneſs of the Stomach, and alimentary Tubes, will enſue *Crudities*, *Vomitings*, *Purgings*, and a coarſe, viſcid Chyle; which will conſequently depauperate the Blood, and fill it with Particles too bulky to paſs freely through all the decreaſing Series of the Veſſels.

III. The Glands of the Stomach being greatly relaxed, and their excretory Ducts widened, a Deal of groſs, phlegmy, pituitous Matter will fall into it's Cavity; which will further create *Sickneſſes* and *Vomitings*.

IV. The Laxity of the Glands continuing, they may, in the End, be totally obſtructed with viſcid, ſizy Matter, and rendered hard, knotty, and ſcirrhous: Whence continual Reachings to vomit, and terrible, cruciating Pains in the Stomach.

433. From what has been ſaid, we may eaſily apprehend the bad Effects which diſtilled, ſpirituous Liquors will have on the other *Viſcera* of the Body: For, ſince they are diſpoſed to weaken the whole vaſcular Frame, and to produce a *Lentor* in the Fluids, by fettering and entangling the Globules of Blood, and proving a powerful *Copula* between the moſt fluid Parts thereof; we may reaſonably expect *Obſtructions*, *Tumours*, *hectic Fevers*, *Impoſthumes*, *Abſceſſes*, *Ulcers*, &c. to follow a conſtant Uſe of them, as we ſhall demonſtrate in the ſubſequent Chapter.

434. *Secondly*, *Exceſſive Venery*, without Diſpute, depauperates the Blood, waſtes the Spirits, and very much debilitates the Tone and Vigour of the Fibres, by the violent and intenſe Contractions they are under at ſuch Times, and by draining from the Blood the moſt volatile, ſubtile, active, ſtimulating Particles thereof. Thoſe who are experienced in theſe Affairs can well tell us, how active,

lively, and agile, they are upon refraining ſome Time from venereal Exerciſe; and how dull, flaggy, and relaxed they ſeem to be after exceſſive Debaucheries. Since, therefore, a right Diſcharge of all the animal Functions depends upon a due Tenſion and Springineſs of the Solids, it is plain, that whatever diſorders and weakens this Diſpoſition of the Fibres, muſt neceſſarily prejudice the whole Conſtitution; and ſince *Coition*, perhaps, may be the moſt violent Action the Fibres are capable of, it cannot be doubted, but if it be too often repeated, it will injure their Contextures, and debilitate their Springs: Hence particular Weakneſſes may enſue, which oftentimes lay the Foundation of *conſumptive Caſes*.

435. *Thirdly*, *Immoderate Grief* is well known to weaken the Nerves, and unbend the Spring of the Solids; to depreſs the vital Heat, and to hinder the due Comminution of the animal Fluids; whence the Appetite is weakened, the Digeſtion is rendered imperfect, and groſs Chyle is ſent into the Blood, too viſcous to be aſſimilated as it ought, and, conſequently, unfit for Nutrition and Excretion: Hence the Circulation is retarded through the minuteſt Veſſels, the

Fluids become foul and grumous, and Obſtructions are oftentimes generated, which lay the Foundation of *hectic Fevers*. *Morton* * obſerves, that all who are upon the Confines of a Conſumption are ſubject to Paſſion, to Sadneſs, hypochondriacal Oppreſſions, hyſteric Fits, and to a Want of Appetite: All which are evident Tokens of weak and relaxed Fibres.

436. *Fourthly*, *Intenſe Study* may be prejudicial, by ſitting ſtill too much, by hindering Digeſtion, by waſting the Spirits, by contracting and leſſening the Capacity of the Veſſels, eſpecially thoſe of the Brain, by too great an Intenſeneſs of Thought, and by rendering Reſpiration leſs frequent and ſtrong. Whoever maturely conſiders theſe Things, and that the Blood receives a very material Alteration in it's Texture, from the Action of the Lungs, will readily conceive the bad Effects of a ſedentary, ſtudious Life, particularly to Perſons of delicate Conſtitutions, who have naturally a Diſpoſition to form Obſtructions in the Glandules, from a viſcid, indigeſted Chyle, and for Want of ſufficient Power in their ſeveral Organs, to attenuate and aſſimilate the Fluids.

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* Vide *Phthyſiologia*.

437. *Fifthly, Living continually in a moiſt Air*, or upon *viſcous, glutinous, oleaginous Food*, may relax the Veſſels, unbend the Spring of the Fibres, and diſpoſe the Blood and Lymph to generate Obſtructions; as we have demonſtrated already.

438. *Sixthly*, In enumerating theſe Things we muſt not forget a ſimple, ridiculous Cuſtom of wearing *Flannel* next the Skin; which, as it relaxes the ſubcutaneous Glands, and their excretory Ducts, will conſequently promote Perſpiration and Sweat; and ſince it is generally adviſed to weakly People, whoſe Veſſels are already too lax, and who ſweat too much, it muſt needs be a very pernicious Cuſtom. The common Excuſe for it is, that it dries up the Sweat, and prevents their catching Cold; but this is a great Deceit, and ſo inconſiſtent with the *Laws of the animal Oeconomy*, that any one, who is in the leaſt verſed in them, may eaſily diſcover the Fallacy. A *Cold-Bath* will more effectually prevent catching Cold, than a *Flannel Shirt*.

439. But not to carry this Inquiry any further, it appears that whatever will relax, unbend, and deſtroy the Spring of the Fibres, may be the Cauſe of profuſe Excretions,

tions, and, conſequently, diſpoſe the Blood and Humours to be groſs, viſcid, and glutinous. And this brings me to conſider ſome other *antecedent Cauſes* of *hectic Fevers*, which, though they may ſeem of a different Nature from thoſe already mentioned, yet they are all ſure to ſpoil the *Craſis* of the Blood, and to weaken the Veſſels.

440. Theſe are, *too haſtily ſuppreſſing any natural or unaccuſtomed Evacuations*; ſuch as the *Catamenia* in Women, the *Hæmorrhoids* in Men, *inſenſible Perſpiration*, *Sweating in the Hands or Feet*, *Fiſtulas*, *Ulcers*, *Iſſues*, &c.

441. I. If any *natural Evacuation* is ſuppreſſed, and continues ſo for ſome Time, it is evident that much Matter will be retained in the Habit, which ought, in a healthful State, to have been excreted: Hence a greater Weight will be laid on the Veſſels, and the Blood and Lymph will not only paſs through the capillary Arteries more difficultly, but be apt to depoſit a ſlimy Mucus upon any Part that is diſpoſed to receive it. Add to this, that daily Experience, and the eſtabliſhed Laws of the animal Oeconomy, ſufficiently inform us, that when ſuperfluous Blood, or any of the Humours ſecreted from

it, however innocent they may be at firſt, are pent up in the Body much longer than uſual, they will neceſſarily grow hot, ſharp, acrid, and irritating; in conſequence of which, they may produce an inflammatory Diſpoſition, which, if it ſhould fix upon any of the internal *Viſcera*, might probably end in *Tubercles*, *Tumours*, *Abſceſſes*, *Ulcers*, and *deep incurable Conſumptions.*

442. II. *Accuſtomed Evacuations* of long ſtanding, oftentimes become, at laſt, very uſeful and advantageous, to the animal Oeconomy, by draining from the Blood ſome ſuperfluous, uſeleſs, excrementitious Matter, which otherwiſe might incumber the delicate fine Veſſels, and lay too great Streſs upon them; or they excrete ſome putrid, acrid, corroſive Particles, which, if retained in the Maſs of Blood, might corrupt the Fluids, and debilitate the Solids.

443. Hence it appears how dangerous it might be to ſhut up *Iſſues*, *Ulcers*, *Fiſtulas*, or to ſtop *periodical Hæmorrhages*, *Sweating in the Hands, and Feet*, &c. without proper Advice. An eminent Inſtance of this we meet with in the *Philoſophical Tranſactions*, N° 272. where a Man, by ſtopping a *periodical Hæmorrhage* in one of his *Thumbs*,

which he had been accuſtomed to from his Infancy to the *twenty-fourth* Year of his Age, brought on a *Sputum Sanguinis*; which had like to have coſt him his Life. I have more than once met with incurable Conſumptions, which were brought on by ſuppreſſing the Excretion of Sweat in the *Feet*, *Hands*, and *Arm-pits*; and others I have known, who have impaired their Healths, and rendered themſelves weakly and ſickly ever afterwards, by the like unadviſed Practices: For when *Nature* has choſen, and, for ſome Length of Time, exerciſed new and extraordinary Methods of Oeconomy, ſhe ſeems to be as fond of their Continuance, as at other Times, and in her moſt regular State, ſhe is of that which is her moſt uſual and ordinary Courſe.

444. From what has been ſaid it is obvious to every one, how irrational it is to ſtop any natural or accuſtomed Evacuation, at leaſt without previouſly diſpoſing the Humours to paſs freely through the minuteſt *Tubuli*, and ſtrengthening the whole vaſcular Frame, ſo as to be able to aſſimilate the Matter which is retained in the Habit, into wholeſome Juice, and to prevent it's tending either to an acid, or an alkaline Acrimony.

445. *Laſtly*, By diligent Obſervation it appears, that there are few Inſtances of this Diſeaſe, which are not, ſome Way or other, *ſymptomatical*, or that take not their Riſe from ſome preceding Illneſſes * ; ſo that it may be made a Queſtion, whether we have any Conſumptions *Original*, unleſs the *Hereditary*, or thoſe which, from the Parent, are impreſſed on the *prima Stamina Vitæ*, in the *Offspring Fœtus*.

446. Hence *acute*, *intermitting*, and *ſcarlet Fevers*, *Meaſles*, *Small-Pox*, *Peripneumony*, *Pleuriſy*, *Hoarſeneſs*, *Cough*, *King's-Evil*, *Aſthma*, *Green-Sickneſs*, *Cachexy*, *Scurvy*, *hypochondriacal* and *hyſterical Affections*, and many other Diſtempers, oftentimes terminate in a *hectic Fever*, by leaving the Fibres in a lax, weak Condition, and the Fluids groſs, viſcous, and ſizy ; in conſequence of which, Obſtructions are generated in the *Viſcera* : For when ſome Parts of the Blood are aggregated, or united into Corpuſcles too bulky to paſs freely through the decreaſing Series of Veſſels, thoſe Canals are moſt likely to be obſtructed, whoſe Texture is weakeſt, and where, by their different Windings, and Turnings, the greateſt Reſiſtance is given.

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* Vide *Diſcourſe concerning Fevers.*

Now ſince the Glands are only ſo many Convolutions of minute Veſſels wound up together, it is inconceivable what an infinite Number of Angles and Turnings the ſanguine and lymphatic Arteries muſt neceſſarily make; and as the Reſiſtance to any circulating Fluid is according to the *Angle of Incidence*, ſo, conſequently, the *Lungs*, *Liver*, *Spleen*, *Pancreas*, *Kidneys*, *meſenterial Glandules*, &c. are the moſt likely Parts to be obſtructed by viſcid Humours, as being the greateſt Bundles of Veſſels wrapped up together.

447. Experience ſufficiently teſtifies, that ſome of theſe are the Parts principally affected by the *Antecedents* to this Diſeaſe; and from what has been ſaid, we may reaſonably conclude, that the Cauſe of Obſtructions in any of the glandulous Bodies, is a viſcid Blood and Lymph damming up the ſanguine and lymphatic Arteries; in conſequence of which, the Juices grow acrid, and irritating, and many direful *Phænomena* are excited, as we ſhall ſhew in the following Chapter.

CHAP. VIII.

Of the Riſe *of the moſt uſual* Symptoms *incident to a* hectic FEVER.

448. FROM the Doctrine of the foregoing Chapter we may obſerve, that the *Antecedents* to this Diſtemper are diſpoſed to weaken the Tone, Vigour, and Elaſticity of the animal Fibres; to inlarge or ſuppreſs the natural or accuſtomed Evacuations; and to render the Blood and Lymph viſcous and acrid; in conſequence of which, Obſtructions are generated in the *Viſcera*, and the following moſt uſual *diagnoſtic Phænomena* are produced:

449. I. *A quick, low, weak Pulſe*, is the firſt Appearance of a Tendency towards a *hectic Fever*.

450. To illuſtrate this in the cleareſt Manner, it may be proper to obſerve, that the Quickneſs of the Pulſe ſeems, in a great Meaſure, to be owing to the Quantity of refluent Blood derived to the Heart, in a given Time: For, was not the Heart to receive, and caſt out the Blood as faſt as it returns, it

would preſently pen back, and be accumulated in the larger Veins, and produce polypoſe Concretions, ſo as to put a Stop to all Motion.

451. Now the Quickneſs of the Pulſe in the preſent Caſe, is undoubtedly owing to the Laxity, and Dilatation of the ſeveral Series of Veſſels, whereby the Blood paſſes with leſs Reſiſtance through the ultimate, minuteſt *Tubuli*, and that for theſe Reaſons *:

I. The Veſſels being dilated, the Cylinder, whoſe Baſe is the perpendicular Section through the Axe of the narroweſt Paſſage of the Canal, will thereby be augmented, and conſequently many more Particles than otherwiſe, get free, without ſtriking againſt the Sides of the Canal.

II. Thoſe Particles which do not ſtrike, are removed to a greater Diſtance from the Sides of the Canal, *i. e.* their Motion is quicker; for, in this Caſe, the Sides of the Veſſels are as *Fulcra*, and the greater Diſtances, as longer *Vectes*, and, conſequently, the Celerity as theſe *Vectes*.

III. The Surfaces of little Things have a greater Proportion to their Bulks or Solidities, than thoſe of greater Things to theirs; and therefore the internal Surface of a ſmaller Veſſel, will be greater in reſpect of it's contained Fluid, than thoſe of a greater Veſſel in reſpect of it's; and, conſequently, againſt the internal Surface of this dilated Canal, fewer Particles of Blood will ſtrike, than againſt the ſame when it was narrower.

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* Vide *Cheyne's New Theory of Fevers.*

452. To demonſtrate the Verity of our Theory, we need only take Notice of the Pulſes of young Children, which are always found to beat quicker than thoſe of grown Perſons, by Reaſon the tender Fibres of the Coats of their Blood-Veſſels, give leſs Reſiſtance to the flowing Blood. And if we add, that the Pulſes of grown Perſons are obſerved to beat faſter during Sleep, than at other Times, (the ordinary Number of Pulſations in a Minute, being from 70 to 80 under a State of waking and moderate Heat; and from 80 to 96 during the Time of Sleep) it is enough to convince thoſe who are moſt propenſe to the contrary, that the Quickneſs of the Pulſe may be increaſed merely by a Relaxation, or an Inlargement of the Diameters of the Veſſels.

453. Another Cauſe of the Quickneſs of the Pulſe, in the *Increaſe* of *hectic Fevers*,

may be the profuſe Diſcharges which are oftentimes made from the Blood; whereby the *Impedimentum* from the precedent Blood is, in ſome Meaſure, removed, and leſs Reſiſtance is given to the Motion of the Heart and Arteries. Whoever doubts this, may be perfectly ſatisfied of the Truth of it, by examining thoſe accurate and ingenious Experiments which Dr. *Hales* * hath lately communicated to the World. In Exp. II. he tells us, he took a Horſe and tied him down, and opened the *crural Artery*. The Horſe's Pulſe beat forty Strokes in a Minute, before he was diſturbed or tied down; but when the crural Artery was opened, and the Blood let out to the Quantity of 10 or 12 Quarts, the Pulſe was more and more accelerated, as the Horſe grew fainter, ſo as to beat a *hundred* Times, or more, in a Minute.

454. Hence it is evident, that though the *Vis Vitæ* was vaſtly decayed, and the projectile Force of the Blood was exceedingly weak, yet the Pulſes were extremely quick: And the very ſame Thing we ſometimes meet with in conſumptive Caſes, where the Habit is prodigiouſly drained by exceſſive *Sweats*, *Diarrhœas*, &c.

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* Vide *Statical Eſſays*, Vol. II.

455. A third Cauſe of the Quickneſs of the Pulſe, in this Diſeaſe, may be ſome Obſtructions in the *Viſcera*, which, as they ſhorten the Circle of the Blood, will make it's Return to the Heart more frequent, and conſequently accelerate the Pulſe, as hath been ſufficiently demonſtrated above, Chap. II.

456. From what has been ſaid, we may deduce the following *Corollaries*:

I. If the Quantity of Blood be ſuddenly diminiſhed, without any previous Relaxation of the Veſſels; the Pulſe may be accelerated, merely by abating the Reſiſtance of the precedent Blood, or by leſſening the *Vis Inertiæ* of the Fluids.

II. If the Veſſels are dilated, though the Quantity of the Blood continues the ſame, the Velocity of the Pulſe may be increaſed, by abating the Friction from the internal Surfaces of the Canals.

III. If Obſtructions are fixed in the *Viſcera*, the Pulſe will be quick, by reaſon of a more plentiful Flow of Blood to the Heart; and they will continue to be ſo till the Obſtructions are removed.

IV. The Force of the Blood, and the Quickneſs of the Pulſe are continually vary-

ing,

ing, according to the more or leſs plethoric State of the Blood-Veſſels, and according to a greater or leſſer Degree of Tenſion in their component Fibres.

457. The *Weakneſs* and *Lowneſs* of the Pulſe are generally owing to a Diminution of the Quantity of Blood, and to an Inlargement of the arterial Tubes; for when the Quantity of Blood is leſſened, and the Diameters of the Arteries are grown bigger, the Reſiſtance from the precedent Blood will be leſs, and therefore the Expulſion of the Arteries outwards will be leſs alſo.

458. II. *Heat* is a conſtant *Concomitant* of *hectic Fevers*, in a greater or leſſer Degree. At the Beginning it is very moderate, giving no other Uneaſineſs than Fluſhings in the Face, or more than ordinary Warmth in the Hands: For though the Pulſe may be exceedingly quick, the progreſſive Force of the Blood may not be proportionate thereto; and ſince the Blood-Veſſels of hectic Perſons are remarkable for being large, it is certain that the Friction and Colliſion of the Blood-Globules, againſt the Sides of the Veſſels, and againſt each other, is much leſs than when the Fibres are tenſe and contracted, and the tranſverſe Sections of the ſeveral Se-

ries of Veſſels are diminiſhed. Hence, though the Heat may be ſomething above the healthful Standard, yet it falls vaſtly ſhort of that of an *acute Fever*.

459. *Hectic People* always complain of more than ordinary Heat after a full Meal.

I. Becauſe the diſtended Stomach may preſs upon the deſcending Trunk of the *Aorta*, and reſiſt the Motion of the Blood downwards: Whence a greater Share may be propelled into the aſcending Trunk, and, conſequently, the *Arteriolæ* in the *Cheeks* and *Hands* will be more plentifully ſtored with Blood than uſual.

II. A large Quantity of Chyle being thrown into the Blood, when the Veſſels are weak and lank, will occaſion a Faintneſs, Liſtleſneſs, and a glowing Heat; eſpecially in the Face, Hands, and Feet, they being more plentifully ſupplied with Blood-Veſſels than any other external Parts of the Body. The Fullneſs of the Veſſels, and the Friction, Colliſion, and inteſtine fermentative Motion which always neceſſarily happen between the component Particles of the Blood, and thoſe of the newly received Chyle, does give ſome Uneaſineſs to the ſtrongeſt Men, when they eat too much; and, conſequently, in very weak Perſons, where the Vigour of the Veſſels is not ſufficient to aſſimilate the Chyle as uſual, the ſtrongly attracting Power between the conſtituent Particles of two ſuch heterogeneous Liquors, as the Blood and Chyle, will occaſion a greater Degree of Fermentation, a Quickneſs of the Pulſe, and a greater Degree of Heat.

460. III. In the *Increaſe* of this Diſtemper, when the Veſſels grow more and more lax, the Globules both of the Blood and Lymph may be compacted and united into little Grumes or Clots, through the Slowneſs of their progreſſive Motion, eſpecially in the decreaſing Series of Veſſels, and the Power of their own Attraction; whence their Superficies being increaſed, and their ſpherical Form deſtroyed, they become leſs capable of paſſing the minuteſt Meanders. Hence Obſtructions are fixed in the *Viſcera*, the Blood is accumulated in the larger Arteries, the Agitation and Friction of it's Globules are greatly increaſed, the Blood becomes more acrid and irritating, and the Heat grows more intenſe; ſo that the *Fever*, at this Time, ſeems to border upon the *inflammatory* Kind, and is commonly attended with darting, pungent Pains in ſeveral Parts

of the Body, but more particularly where the Obſtructions are ſeated.

461. IV. In the *Height* of this Diſeaſe, when *Tubercles*, *Tumours*, or *Swellings of the Glands*, tend towards Suppuration; when there is any *Collection of purulent Matter*, or any *internal Ulcers*, the *Heat* is increaſed, not only by Pain and Obſtructions, but by ſome acrid, ſharp, and ill-conditioned Particles which are continually received into the Maſs of Blood from the putrid, purulent Matter; and which, by their Acrimony, irritate and waſte the Solids, and by their corroſive diſſolvent Quality, corrupt the Juices, and render them hot, acrid, and alkaline. The *Fever*, at this Time, commonly puts on the Face of an *Intermittent*.

462. Hence *Impoſthumations*, *Abſceſſes*, *putrid internal Ulcers* (and the very ſame Thing would happen from *external* ones, if the purulent Matter was not to be wiped away) quicken the Pulſe, accelerate the Motion of the Blood, and render the Juices ſharp, acrid, and ill-conditioned.

463. Thus in regard to the *Heat*, or *Fever*, it matters not in what Part of the Body the Obſtructions are fixed; for whether it be in the *Lungs*, *Liver*, *Spleen*, *Kidneys*, *Meſen-*

tery, or in any other *Viſcus*, the Pulſe will be quickened, and a Fever will enſue.

464. As to the other Symptoms indeed, they muſt neceſſarily vary, according to the Situation of the Diſeaſe: Thus, for Inſtance, if the Obſtructions are in the *Lungs*, the chief *Pathognomonic* Signs will be as follow, *viz. A Difficulty of Breathing, with a Senſe of Weight, and a ſlight obtuſe Pain, and Uneaſineſs in the Breaſt, which is moſt perceivable in a full Inſpiration; a Hoarſeneſs, dry Cough at firſt, frequent Vomitings, ſpitting of viſcid, purulent, ſanious Matter towards the latter End, ſpitting of Blood, a Vomica Pulmonum*, &c.

465. I. If we conſider the Mechaniſm of the Lungs, and that as much Blood paſſes through them, in the ſame Space of Time, as through all the other Parts of the Body, it will evidently appear, that when numerous Obſtructions, or Tubercles, are formed in their Glands, which either partially, or totally, obſtruct the Courſe of the Blood, through an infinite Number of capillary Blood-Veſſels, a greater Quantity of Blood, muſt neceſſarily be accumulated in the more pervious Tubes; in conſequence of which, they will be more than ordinarily diſtended

and thereby they will preſs harder than uſual upon the little Air-Bladders, or Veſicles which receive the Air at every Inſpiration; Hence *a Difficulty of Breathing*; or there is a ſtronger Force required to inflate the Veſicles.

466. II. The Perception of a greater Weight than uſual upon the Breaſt, may ariſe either from the Quantity of morbific Matter lodged in the Lungs, or from a Relaxation or Weakneſs of the Muſcles ſerving Reſpiration; whence there may be a falſe Appearance of Weight.

467. III. Though *Tubercles* in the Lungs are not very troubleſome in the Beginning, yet when they are confirmed, and the obſtructed Parts begin to ſuppurate, it may eaſily be apprehended that the capillary Arteries will be violently diſtracted, and ſlight Inflammations, with darting Pains, will ariſe; which ſometimes imitate a *Peripneumonia*; and, if the Lungs adhere to the *Pleura*, a *Pleuritis*.

468. IV. When the Glands of the Lungs, whoſe Office it is to ſecern ſome ſmooth, mucous, oleaginous Matter, in Order to ſoften and malax the nervous Membranes which line the *Larynx*, and other Parts

ſerving the Modulation of the Voice, and to defend them from the Injuries of the Air, are obſtructed, a *Hoarſeneſs* will neceſſarily ariſe from the Rigidity of the Membranes, and an Inability to proper Contractions for forming the Voice.

469. V. A *Cough* is the moſt perplexing *Concomitant* belonging to a *Conſumption of the Lungs.* At firſt it is dry, and ariſes from an Irritation of the Matter pent up in the obſtructed Glands, as alſo from the Stiffneſs of the nervous Membrane lining the *bronchial* Pipes, and from the *Stimulus* of the Air, which has now too free an Acceſs to the nervous *Fibrillæ*, for Want of mucous Matter to defend them. But in the Progreſs of the Diſeaſe, when the obſtructed Matter begins to digeſt and corrupt, the ſerous, watery, or thinneſt Parts will, of Courſe, be ſqueezed out firſt, through the excretory Ducts, into the Cavity of the *bronchial* Veſſels; and being very acrid, ſaline, and ſharp, it further irritates the Nerves, and excites moſt grievous Fits of Coughing. And in the *Height* of the Diſeaſe, when the Matter is farther digeſted, and the excretory Ducts are widened, or when Abſceſſes or Ulcers are formed in the Lungs, the *Cough* is aggra-

vated by a vaſt Quantity of viſcous, putrid Matter, which is diſcharged into the *bronchial* Pipes. The Matter which is ſpit up, is ſometimes ſweet, and at other Times very fœtid, ſanious, and offenſive; according as it has lain a longer or ſhorter Time out of the Verge of Circulation.

470. If the Tubercles are placed on one Side of the Lungs, more than on the other; or if one Side of the Breaſt is more affected than the other, the *Cough* is excited by lying on one Side, more than on the other.

471. The *Cough* is alſo aggravated by a full Meal, which, as it preſſes upon the *Diaphragm*, and thereby leſſens the Cavity of the *Thorax*, excites Fits of Coughing, and by the Conſent of Parts, neither the Stomach nor Cough are eaſy till the Aliment is vomited up.

472. VI. *Spitting of Blood* is very common when the Obſtructions are fixed in the Lungs; for as every Impulſe from the Heart is an Effort of Nature to diſlodge and remove the *Impedimenta*, and as the obſtructing Matter is too viſcous to give way, it muſt neceſſarily happen that ſome of the fine, tender, delicate *Arteriolæ* will burſt, by the long continued and repeated Impulſes

of the circulating Blood. Hence we may apprehend how dangerous it is for thoſe of weak Lungs to uſe violent Exerciſe or Motion; for when a Man ſtrains to lift a great Weight, or to run hard, *&c.* the Blood will be more forcibly propelled into the Lungs, and the Heart will oftentimes beat, inſtead of 70, 120 Times in a Minute.

473. VII. When the *Tubercles* are large and inflamed, and ſeveral of them run together, they form *Tumours*, or large Swellings which will neceſſarily apoſthemate, and burſt; for the obſtructing Matter, by lying out of the Verge of Circulation, will, in Time, according to the *eſtabliſhed Laws of Nature*, corrupt, putrefy, and degenerate into *Pus*; and this purulent Matter being contained in a *Cyſtis*, formed out of the veſicular Subſtance of the Lungs, and the Quantity of it continually increaſing, from the Mouths of the ruptured ſanguine and lymphatic Arteries, the Membranes muſt, in the End, give way, and the *Pus* will fall either into the *Bronchial Pipes*, or into the *Cavity* of the *Thorax*. When it burſts into the bronchial Veſſels, it produces a true *Vomica Pulmonum*; and when it diſcharges it-

ſelf into the Cavity of the Breaſt, it occaſions an *Empyema.*

474. Theſe are the *Phænomena* which moſt uſually attend a *Phthyſis,* or *Conſumption of the Lungs;* but when a Conſumption ariſes from *Tumours* and *ſcirrhous Swellings* in the Glands of the *Meſentery,* or in any of the *Viſcera* of the *lower Belly,* the Symptoms are according to the Parts affected, and the Pains generally direct us to them. Thus, if the *inteſtinal Glands* are obſtructed, *griping Pains, a coſtive Habit,* and all the Symptoms of a *Chloroſis,* and *Cachexia,* generally begin the Complaint. If the *renal Glands* are affected, the Symptoms reſemble thoſe of the *Stone.* And if the *Liver* or *Spleen* be the diſeaſed Parts, the *Phænomena* are agreeable to thoſe of the *Jaundice, Hypochondriacal Affections,* &c.

475. But in the laſt *Stadium* of this Diſeaſe, whether it proceeds from *Tumours* in the *upper* or *lower Belly,* there are ſome Symptoms which equally attend it; *viz. profuſe, colliquative Sweats, a Diarrhœa, making large Quantities of Urine, and ſwelled Legs.*

476. Theſe are the Conſequents of the greateſt Decay of vital Vigour in the Fibres,

whereby the excretory Ducts of the *miliary*, *inteſtinal*, and *renal* Glands are vaſtly dilated and widened; and of an acrid, corroſive, diſſolvent Quality in the Fluids, from the long continued Heat, which renders the animal *Salts* and *Oils* of an *alkaline* Diſpoſition, whereby they ſtrongly attract and diſſolve the Band of Union between the ſeveral Orders of Blood-Globules, and reduce the red ones back again into Lymph.

477. It is impoſſible to have an Opportunity of examing the Blood at this Time of the Diſeaſe, becauſe *Bleeding* would inevitably haſten Death; but I am perſuaded by the Symptoms, that the red Globules bear but a ſmall Proportion to the ſerous Parts of the Blood: So that conſidering how long, and how much the ſerous Parts of the Blood have been waſted, by profuſe Excretions at ſeveral Emunctories, it manifeſtly appears, that the remaining Maſs of Blood would be all *Gore*, at this Time, and could not afford ſuch Quantities of Lymph, as run off by *Sweat*, *Urine*, and *Stool*, if the Veſſels had a Power of aſſimilating the Aliment into red Globules as they ought, and if the ſaline and oleaginous Particles did not acquire by the long continued Heat, a diſ-

ſolvent Quality. In the *Beginning* of *hectic Fevers*, the Blood is oftentimes ſmooth, mild, balſamic, and offends only by being too viſcous and thick; but in the *Progreſs* of the Diſtemper, a putrid, alkaline Acrimony is certainly the Conſequence of it, and colliquates the Humours.

478. The *Sweats* are moſtly at *Nights*, becauſe the Heat of the Bed, and Sleep both increaſe the Motion of the Blood, and relax the excretory Ducts, terminating in the external Superficies of the Body.

479. The *Looſeneſs*, and *profuſe Diſcharge by Urine*, on the contrary, are chiefly in the *Day-time*, by Reaſon the excretory Ducts of the Skin are then contracted and ſhut up, and the ſerous Matter is reverted upon the Bowels and Kidneys.

480. When all theſe Excretions are in ſome meaſure ſuppreſſed, the detained Matter will fall upon thoſe Parts where it's Motion is ſloweſt, and the Reſiſtance to it's Preſſure is leaſt. * Now the Legs being at the greateſt diſtance from the Heart and Brain, and in the Day-time in a depending Poſture, the Motion of the Blood will be there the ſloweſt, and the Tenſity of the

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* Vide *Wainwright's Non-Naturals.*

Fibres of the weakeſt; and conſequently the Legs will ſwell ſooner than any other Part of the Body.

CHAP. IX.

Of the Cure of a hectic FEVER.

481. FROM the Reaſons adduced in the precedent Chapters, it is pretty manifeſt, that before we can arrive at a plenary Knowledge in curing Diſeaſes, we muſt be able to account for the principal and efficient Cauſes which give riſe to them, and the *Phænomena* that accompany them.

482. Now the Symptoms above recited, do indiſcriminately ſhew a *Laxity* in the ſeveral Series of Veſſels, a *Lentor* in the Fluids, and *Obſtructions* fixed in ſome of the *Viſcera*; in Conſequence of which, *Tubercles* ariſe in the *Lungs*, or *Tumours* in the *lower Belly*, which oftentimes end in *Impoſthumes*, *Abſceſſes*, *Ulcers*, &c.

483. For theſe Reaſons, therefore, we have thought it moſt proper to divide our *Method of Cure* into three Parts; *viz.*

I. We ſhall ſhew the moſt rational Practice where the Symptoms ariſe merely from lax Fibres, and exceſſive Evacuations by *Sweat*, *Urine*, *Stool*, *immoderate Fluxes of the Menſes*, *Fluor albus*, &c. without any Obſtructions being actually fixed in the *Viſcera*, either of the *upper* or *lower* Belly.

II. We ſhall point out the beſt Medicines where the *Phænomena* proceed from *Obſtructions* or *Tumours*, either in the *Cavity* of the *Thorax*, or in that of the *Abdomen*.

III. We ſhall lay down the moſt probable Method of relieving *internal Ulcers*, both in the *Lungs*, and in the *Viſcera* of the *lower Belly*.

484. *Firſt*, In the *Beginning* of this Diſeaſe, where the Fever is not confirmed, where no Obſtructions are ſettled in the capillary Veſſels, and where the *Phænomena* proceed merely from lax Fibres, and profuſe Excretions, without any *Impedimenta* to the Circulation, through the glandular Syſtem; it is evident that the chief Buſineſs is to reſtore the natural Vigour and Elaſticity to the Veſſels, and to amend and preſerve the *Craſis* of the Blood and Humours, whereby the ſeveral Secretions and Excretions may be performed in a regular and healthy Manner.

Now it is well known, that whatever will recover a due Tone in the Fibres, will greatly aſſiſt in rendering the Blood of a proper Conſiſtence, and duly fluxile; and whatever will amend the *Craſis* of the Blood, will help alſo to recover the Spring of the Fibres.

485. But before we proceed to the Uſe of thoſe Medicaments which free the Blood from Acrimony, and Viſcidity, and render the Fibres in general more elaſtic and tenſe; we muſt conſider that ſome Parts of the animal Machine are more affected by the *Antecedents* than others are; and therefore it may be perfectly neceſſary to make ſome *Revulſion* from the offended Parts, or to eaſe them of a ſuperfluous Load of Humours flowing to them, whereby they may be able to contract more readily, and recover their former natural Dimenſions with more Eaſe.

486. Thus, for Inſtance, if the Complaints are *exceſſive Excretions* by *Sweat*, *Urine*, *Fluor albus*, &c. it is always thought neceſſary to cleanſe the *Primæ Viæ*, and to drain the Humours from the affected Parts, by *gentle, lenient Cathartics*: For though theſe may abate the vital Vigour of the reſt of the Body, yet ſince they are ſuppoſed to give Eaſe to the Parts aggrieved, by making a

Revulſion from them, they are conſtantly to be exhibited before the Uſe of *Alteratives* and *aſtringent Medicines.*

487. If the Complaint be an immoderate Flux of the *Menſes*, it is the general Practice, if the Patient be not extremely weak, both to *bleed* in the Arm, and to *purge*, before the Adminiſtration of *ſtyptic Remedies.*

488. And when the Diſorder is a *Diarrhœa*, *Vomits* are moſt uſeful to make a Revulſion, and *Purges* are then given only to carry off the excrementitious Matter lodged in the Bowels and inteſtinal Glands; which, if ſuffered to lie there, would become more acrid, ſharp, and irritating, and would, conſequently, excite more frequent Diſcharges.

489. We have already taken Notice, that the *purging Medicines* ought to be very *mild* and *lenient*; ſuch, for Inſtance, as *Rhubarb*, *Manna*, *Senna*, &c. and for an *Emetic*, the *Rad. Ipecacuanha* has, undoubtedly, the Preference to all other Medicines in *inteſtinal* Fluxes.

490. *Revulſion* being made according to the Strength of the Patient; our next Step is, to brace up the Fibres, and to render the Blood ſmooth, mild, and balſamic. But, ſince the moſt general Cauſe of the Laxity

of the Veſſels, and the Depravity of the Fluids, is an Abuſe of ſome of the *Non-Naturals*, it ſeems moſt rational to begin with a Regulation of them; for the beſt Medicines in the World will avail but little, if the ſame indiſcreet Practices are continued, which gave Being to the Diſeaſe.

I. The *Air* moſt ſuitable to Perſons of weak, flaccid Fibres, is that which is thin, clear, and freeſt from Moiſture; neither too heavy, nor too light, nor too hot, nor too ſharp: So that if our Patient lives in an Air whoſe Qualities are different from any of theſe mentioned, we ought to adviſe a Removal into one more agreeable to his Conſtitution.

II. The *Food* ought to be ſuch as is eaſily digeſted, and aſſimilated into Blood and nutritious Particles, without laying ſuch Streſs upon the Veſſels, or requiring ſuch Force as will weaken their Springs. To thoſe Perſons who are not very lean, and where the Pulſe are not very quick, moderately *acrid*, and *aromatic Aliment* may be proper; but to lean, ſpare Habits, *ſmooth*, *emollient*, *viſcous Food* may be moſt convenient.

III. As to *Drinks*, they ſhould be *ſubaſtringent*, *mild*, and *nouriſhing*; *Briſtol Wa-*

ter mixed with *red Wine*, or *Milk-Water*, *Snail-Water*, &c. ſeem exceedingly proper where the Blood is acrid and hot.

IV. *Much Sleep*, or *lying in Bed* above *eight* Hours in *twenty-four*, is a pernicious Cuſtom, and ought not to be indulged to thoſe of weak Nerves; ſince more than this is well known to ſob and relax the Fibres, and to weaken the Habit by profuſe *Perſpiration* and *Sweat*.

V. *Watching too much* may have as bad an Effect, by hindering the Secretion of animal Spirits, and by waſting thoſe already ſecerned, in too plentiful a Manner.

VI. *Moderate Exerciſe*, eſpecially *riding on Horſe-back*, is, above all Things, to be inſiſted upon, as giving the greateſt Life and Vigour to the Fibres, and attenuating and comminuting the groſſer Parts of the Blood, ſo as to make them paſs freely through the minuteſt Meanders, and to clear the Fibres and capillary Veſſels of all foreign, heterogeneous Matter, which may happen to adhere to them. I have ſo often ſeen People recover from moſt deſperate Caſes, by a continued Courſe of Riding, in a clear, dry Air, that I am induced to believe there is ſcarce any Tendency to a Diſeaſe, that may not be corrected by ſome appropriated Exerciſe.

491. Full Directions being given in regard to the *Non-Naturals*, and to the *Idioſyncraſy* of the Patient, we are to proceed to the Uſe of thoſe Medicines which Experience hath taught us to be moſt ſerviceable in recovering weak, relaxed Fibres, and in preventing profuſe Excretions from the Blood. Now the Strength and Elaſticity of the Fibres is well known to be increaſed by any Sort of Matter whoſe conſtituent Particles are rough, angular, and ſharp-pointed; by which Means they ſtick into, and irritate the Nerves, excite more lively Contractions in the Fibres, ſhorten their Length, and, conſequently, leſſen the Diameters of the ſeveral Series of Veſſels. Or, where the Fibres are waſted, and the Coats of the Veſſels are exceedingly thin, we muſt not truſt to the Force of a *Stimulus*, but it depends more upon the Appoſition of ſoft, ſubtile, ſtrongly attracting, nutritious Particles to the Sides of the Fibres, to recover their loſt Union, and to ſolder their broken Parts: For the thicker the Fibres are, provided they are ſound, the ſtronger and more elaſtic they are, it requiring more Force to bend them and when

they are ſo bent, they vibrate back again with a greater Velocity.

492. For the *firſt* Intention, the *Cortex Peruvianus* is moſt famous, and, with proper Management, is capable of doing Wonders, where the Fibres are only relaxed, and where no Obſtructions are actually fixed in the Courſe of the Circulation. *Terra Japan. Bol. armen. Sang. Dracon. Coral. rub. Gum. Lacc. Cort. Granator. Flor. Balauſt. Roſar. rub. Rad. Rhabarb. toſt. Tinct. Styptic. Helvet.* and all the Tribe of *Aſtringents* are calculated for the ſame Purpoſe.

493. The *Cold-Bath* alſo, in ſome Caſes, may be exceedingly proper to ſtimulate and contract the vaſcular Syſtem, and to give Strength and Energy to the Fibres.

494. A proper Uſe of the *Fleſh-Bruſh* may likewiſe have it's Advantages, in ſtimulating and contracting the ſubcutaneous Glandules, and thereby preventing profuſe Excretions by Sweat.

495. For the *ſecond* Intention, *Vipers* in Broth, in Wine, or in Subſtance, are excellent; as alſo the *Rad. Eryng. Conſolid. maj. Gum. Arabic. Maſtic. Oliban. Succin. alb. Balſ. è Meccâ, Copivi, Album Ovi, Icthyocol. Vermicelli, Sago,* &c. are Medicines which

give Conſiſtence to the Blood, and are capable of adhering to the Sides of the Veſſels, and filling up their Vacuities. *Milk*, *Calves Feet*, *Jellies*, &c. are convenient Food, and ought always to be preſcribed. Proceed we now to the *ſecond* Thing propoſed, *viz.*

496. *Secondly, To point out the beſt Medicines when hectic Fevers ariſe from Tubercles in the Lungs, or ſcirrhous Swellings in the Viſcera of the lower Belly.*

497. If the Account above given of this Diſtemper be juſt, there will be no difficulty in forming the true Indications, and the moſt effectual Method of Cure; for ſince the moſt common and uſual *Phænomena* of this Diſeaſe proceed from viſcid, glutinous Blood adhering to, and ſticking in, the ultimate Branches of the *Arteriolæ*; or from thick, foul Humours, obſtructing the ſecretory and excretory Ducts of the Glands; I think it pretty evident, that the firſt and general Indication is to diſlodge the obſtructed morbific Matter, and to attenuate it fine enough to paſs out of the Body through ſome of the *Emunctories*. And ſeeing the Obſtructions ariſe from ſome clotted, viſcous Matter, bunging up the capillary, ſanguine, and lymphatic Arteries, and excretory Ducts

of the Glands, it is reaſonable to conclude that the moſt probable Means of reſolving the Obſtructions are,

I. To abate the Tenſion of the obſtructed Veſſels, or thoſe leading from them, if at any Time they appear to be more than ordinarily contracted.

II. To attenuate, comminute, dilute, and diſſolve the glutinous, viſcous, ſizy Matter lodged in, and adhering to, the Veſſels.

498. If, therefore, an Obſtruction happens on a very nervous, ſenſile Part, the Diſtenſion of the Veſſels muſt neceſſarily create Pain, in Proportion to the Diſtraction of the nervous *Fibrillæ*, which help to conſtitute the obſtructed Veſſels: And ſince all Pain is well known to bring on a greater Tenſion of the obſtructed and adjacent Parts, and a greater Flow of Humours to thoſe Parts, it is evident that the Veſſels will be more and more diſtended, and an Inflammation will ariſe, attended with cruciating Pains, which nothing will relieve but *Bleeding:* For though the original Cauſe of the Diſeaſe might be a Relaxation of the Veſſels, and profuſe Excretions, whereby the Quantity of Blood was diminiſhed beneath it's natural, and healthful Standard; yet when

the Obſtructions are large, or numerous, and have been ſtanding ſome Time, the Blood will be accumulated in the larger Veſſels, and there may be as great a *Plethora* in Regard to the paſſable Canals, as though there was much more Blood, and no Impediment to it's Circulation.

499. The Pulſe, at theſe Times, ſufficiently evince the Truth of what has been ſaid; and the *Momentum* of the Blood ſeems to be much too ſtrong againſt the obſtructed Parts as appears by the throbbing, pulſing Pains always complained of when the Inflammations are large.

500. *Bleeding*, therefore, is to be inſiſted on in the Beginning of Obſtructions fixed in any of the *Viſcera*, provided they are attended with darting Pains, and an inflammatory State; in order to revel from the obſtructed Part, to abate the Diſtenſion of the Veſſels, and to prevent any immediate Danger of their burſting. Beſides, let us add, if Bleeding be omitted in the Beginning, and the obſtructed Veſſels are ſuffered to be long upon the Stretch, there will be much more Danger of the inflamed Tubercles in the Lungs, or Swellings in the Glands of

the lower Belly, apoſthemating and exulcerating.

501. After Bleeding, the Medicines which take Place are thoſe which will dilute, and reſtrain the Heat and Motion of the Blood, deſtroy and ſheath the Acrimony of the Humours, lubricate and relax the obſtructed Veſſels, and abate the Inflammation. The *Species Diatragacanth. frigid. Pulv. Hali, Pulv. è Chel. Canc. comp. Sperma Ceti, Sal Nitri, ſmooth emollient Linctuſes,* and ſuch like Medicines are generally preſcribed till the Inflammation and Pains are abated; drinking after them the *Pectoral Decoction, the common Emulſion, Barley-Water, Linſeed, or Liquorice Tea, a thin Decoction of Marſh-Mallows, Medicated Whey, prepared with Fol. Tuſſilag. Heder. Terreſt. Agrimon. Pulmonar. Scabioſ. Capil. Ven. Flor. Bellid. maj.* &c.

502. Thus *hectic Fevers,* when they ariſe from inflamed *Viſcera,* are to be treated as common *inflammatory* Fevers, till the *Heat, full Pulſe, darting, throbbing Pains,* and all the Symptoms of an Inflammation are abated: For ſince *Suppuration* is the Conſequence chiefly to be dreaded and prevented, the firſt and general Indication is to hinder

the tumefied Glands from apoſthemating. But ſince the conſtituent Veſſels of the Glands are prodigiouſly complicated, ſince their Fibres are generally very lax, ſince the *Antecedents* are diſpoſed to depoſite a ſlimy *Lentor* on the capillary Veſſels of the Glands; and ſince this *Lentor* is ſeldom removed by abating or taking off the Inflammation, it follows, that the moſt difficult Taſk may yet be behind, *viz. To diſſolve the Lentor obſtructing in the capillary, ſanguine, and lymphatic Arteries, and in the ſecretory and excretory Ducts of the Glands; which is the Foundation of Tubercles in the Lungs, and of Tumours in the lower Belly; and which, if not removed, in a proper Time, will inevitably terminate in Apoſthemations, Abſceſſes, Ulcers,* &c.

503. We are aſſured by *Hippocrates, Lib. de Medic.* that it is a very artful Thing to cure *Tubercles* in the *Lungs:* For ſince the Texture of the Glands are but weak and ſpungy, they are not always able to bear an Impulſe proportionable to the Viſcidity of the morbific Matter, obſtructing in them, without further diſtending the Veſſels, and producing a freſh Inflammation, or an *Hæmoptoe*. And if we do not exhibit Medi-

cines capable of attenuating, and reſolving the *Lentor*, we only palliate the Matter, and deceive our Patients.

504. This it is that renders the Cure of *Pulmonary Conſumptions* ſo extremely difficult, eſpecially in thoſe of a delicate Make, whoſe Fibres are exceedingly thin and tender, and whoſe Blood-Veſſels are almoſt diaphonous. Theſe People cannot bear the Impulſe of ſharp, active, irritating, volatile, and ponderous Medicines; by Reaſon the former will increaſe the Heat and Acrimony of their Humours, and the latter will endanger an Inflammation, or an *Hæmoptoe*.

505. Our great Care, therefore, ought to be to find out ſuch Medicines as will diſſolve, and dilute the *Lentor*, before the Body is too much extenuated, and give Eaſe to the Symptoms without inflaming or burſting the Veſſels. But as Obſtructions in different Parts will produce different *Phænomena*, and may require different Treatment; we ſhall here make ſome Diſtinction between the *Cure* of *Tubercles* in the *Lungs*, and the *Cure* of *Swellings* in the *Viſcera* of the *lower Belly*.

506. *Firſt* then, *of the Cure of Tubercles in the Lungs*. If the *Cough* be very violent,

if the nervous Membrane which lines the *bronchial* Pipes be dry and uneaſy, for Want of mucous Matter to lubricate and defend it from the Irritation of the Air, and Particles floating in it; ſome *ſmooth, emollient, oily Linctus* may be preſcribed, with *appropriated ſuitable Liquors,* to ſheath the naked, tender Parts, with a mucilaginous Softneſs; though, at the ſame Time, they may be pernicious to the original Obſtructions.

507. For the ſame Reaſon, receiving the *Steam of ſome ſmooth emollient Decoction,* into the Lungs, along with the Breath, may be of Service to ſoften and malax the Mouths of the excretory Ducts of the obſtructed Glands, and to promote Expectoration, by rendering the Membranes ſoft and yielding.

508. *Opiates* alſo are ſometimes ordered, to abate the Violence of the Cough, by giving the Parts a Sort of Inſenſibility, and by thickening the thin, ſharp, acrid Juices which are ſqueezed out of ſome of the Glands, and which are apt to ſtimulate the nervous Membrane of the *Trachea* into frequent Contractions: But theſe are dangerous Remedies where the Obſtructions are large, or where there is a Tendency to an Inflammation; and ought never to be given but in

the laſt Extremity, where the Cough threatens Convulſions, and where no Sleep can poſſibly be procured by Reaſon of a conſtant Irritation.

509. Many, ſays an ingenious *Author* *, place all their Hopes in Things directed to the *Cough*; the *Lozenge* and *Linctus* are in every Body's Hand, but this muſt be attributed to their leading People to take a wrong Aim, to level at the Symptom inſtead of the Diſeaſe. I am confident, ſays he, Legions of the Dead might have been above Ground, if they had but conceived the Fallacy of theſe Means (to wit, Balſamics;) if they had but ſtuck cloſe to the proper Quantities of any good *Alterative*, they might have plunged out of their ſeveral Maladies. Indeed, if we conſider the Matter rightly, it will appear that Obſtructions formed in the ultimate Branches of the *Pulmonary Arteries*, can never be relieved by Expectoration (unleſs after a Suppuration, or an *Hæmoptoe*;) for ſince they have no other Termination but into the *Pulmonary Veins*, they can only be carried off by a Reſolution. And if the Obſtructions are ſituated in the *bronchial Arteries*, whoſe excretory Ducts terminate

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* Vide *Fuller's Medicina Gymnaſtica.*

in the ſeveral Ramifications of the *Bronchia*, it is impoſſible that *oily*, *ſmooth*, *emollient Medicines* ſhould avail, any more than eaſing the *Cough*, before the obſtructed Humours are attenuated, and prepared fit for Expulſion.

510. The greateſt Succeſs, therefore, is to be expected from ſuch Medicines as bid fair to diſlodge the Obſtructions, and to diſſolve, dilute, grind, and abſorb the ſharp, acrid, irritating Particles, which excite the Cough, and other Symptoms: And when theſe are caſt out through ſome of the excretory Channels, and the Blood is freed from Acrimony, the Blood itſelf will prove the beſt Balſamic, and be able to heal up ſuch Veſſels, as have any Ways been injured.

511. If we conſider that moſt Obſtructions in the Glands, begin with an Incraſſation of the Humours which ought to be ſecreted there, it will obviouſly appear that the moſt rational Practice is to depend upon the following Sort of Medicines, which are well known to attenuate, and divide all viſcid Coheſion, or *Moleculæ* in the Blood and Lymph, and to abſorb all acrid, ſaline, ſharp-pointed Particles, and to carry them out of the Habit through ſome of the Emunctories.

512. I. *Gentle mercurial Purgatives*, in ſmall Doſes, bid the faireſt to clear the *Primæ Viæ*, to attenuate the viſcid Humours, and to excrete a Portion of the acrid, ſaline Particles from the Blood; for which Reaſon they ought to be preferred to other Purgatives, and to be exhibited according to the Strength of the Patient, and the Obſtinacy of the Obſtructions. Nor ought we to be deterred from the Uſe of them, if they agree, by Reaſon of the Weakneſs of the Patient; for ſince they comminute and diſſolve the Fluids, and promote the Secretions, they will make abundant Amends for the Injury they may ſeem to do by evacuating Part of the Lymph, and by reducing the Strength. Experience ſufficiently teſtifies the Truth of this; for we often ſee outward and inward Swellings ſoftened and diſcuſſed by the Help of *mercurial Purges* alone; which reſtore Fluidity to the viſcous Juices dammed up in the ſecretory and excretory Ducts of the Glands. We are therefore to look upon *gentle mercurial Purges* as Medicines, whoſe Virtue is to diſſolve the Humours, and to evacuate them when diſſolved.

513. II. On the intermediate Days, and after proper Purging, *Electuaries*, *Boluſſes*,

Pills, *Powders*, *Decoctions*, *Infuſions*, &c. may be made of ſome of the following moſt ſuitable Ingredients to diſſolve the ſizy, viſcid Humours, and to reſolve the Tubercles; *viz. Millepedes, Sapo Venet. Flos Sulphur. Lac Sulphur. Sal Tartar. Sal vol. Succin. Gum. Ammon. Myrrh. Benzoin, Styrac. Balſam. Tolut. Rad. Enul. Camp. Irid. Flor. Rub. Tinct. Lign. Guaiaci, Rad. Sarſaparil. Chin. Fol. Marrub. alb. Heder. Terreſt. Tuſſilag. Hyſſop*, &c.

514. *Chalybeat mineral Waters* are alſo extremely proper, and conduce very much towards the Cure of this Diſeaſe, where there is no Danger of Inflammation, or where the Swellings are crude, and of a cold Nature; for as they attenuate and dilute the Blood, and contribute greatly towards recovering the *Craſis* of the Fluids, they muſt neceſſarily be ſerviceable in reſolving the viſcous Matter ſticking in the Glands, and in diſlodging the Obſtructions, by dilating the Veſſels, and by adding to the *Momentum* of the Blood.

515. *Veſicatories* may be ſerviceable in contributing towards the Attenuation of the Humours, in bracing up the Solids, and in ſuppreſſing the Cough.

516. *All hot, acrid, irritating Medicines,* ſuch as *Camphor, Crocus, Rad. Serp. Virg.* &c. *and all ſtrong, diſtilled, ſpirituous Liquors,* are to be avoided, however faint and ſpiritleſs the Patient may ſeem to be: For as they heat the Blood without reſolving the Obſtructions, the Humours may be more impacted in the obſtructed Glands, and the Tubercles may ſooner come to Suppuration.

517. When the Violence of the Symptoms is abated, and the *Cough* grown rotten, (as it is vulgarly termed) that is, when the obſtructing Matter in the *pulmonic Glands,* is attenuated, diſſolved, and looſened, and ſome Part of it is daily brought up by coughing; nothing will contribute more towards freeing the Glands from tough, viſcous Matter hanging in them, than a *gentle Puke* with *Oxymel Scylliticum,* which has a peculiar Property of deterging the Glands, both as an *Emetic,* and as an *Alterative:* But then we muſt be ſure that the morbific Matter is already thinned, and looſened, and wants only an additional Impulſe to thruſt it forth; for ſhould you give an *Emetic* during the Obſtinacy of the Obſtruction, it is great Chance but you rather increaſe than remove it.

518. But in deſperate Caſes, where the Obſtructions will not give Way to the abovementioned Medicines, and where the Diſeaſe ſeems to be *chronical*, and lingering, our greateſt Dependance is upon *ponderous* Medicines, or ſuch as by their Weight may break through and diſlodge the viſcid, obſtructing Matter. And among all the Medicines of this Kind, *Mercury*, or ſome Preparation of it, ſeems beſt adapted to reſolve the Obſtructions; it being about ten Times as heavy as Blood *, and therefore every Particle of it will have ten Times the Force to diſſolve the *Lentor*, that a Particle of Blood of the ſame Magnitude will have: For the *Momentum* of either a Particle of Mercury or Blood, to break through any Obſtacle, or overcome any Reſiſtance, is a *Rectangle* under the Celerity with which it is moved, and the Quantity of Matter contained in it, which is meaſured by it's Weight.

519. Hence Dr. *Cheyne*, in his *New Theory of Fevers*, with good Reaſon tells us, that the Blood, aſſiſted by any conſiderable Quantity of Mercury, will be able to do as much, in the Removal of Obſtructions, in

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* Vide *Wainwright's* *Non-Naturals*.

one Day, as the Blood unaſſiſted in three Years. And if we add, that *Quickſilver* is the moſt fluid of all Fluids, and diviſible into the minuteſt Parts by the ſmalleſt Force, it will more clearly appear, that it muſt be ſignally beneficial in *glandular* Swellings, as it is moſt capable of paſſing the leaſt permeable Veſſels, of fuſing the Humours, and colliquating the Juices; and, conſequently, of reſolving ſtubborn Obſtructions, ſcarce otherwiſe to be removed.

520. Thus *Æthiops Mineral. Mercurius alkaliſatus*, *Cinnab. nativ. Cinnab. Antimon. Antihecticum Poterii*, &c. are moſt advantageouſly joined with ſome of the abovementioned Medicines, when there is no Inflammation, nor Tendency to an *Hæmoptoe*; for the incraſſated Humour lodged in the Glands, being, by theſe Sort of Medicines, agitated, attenuated, and comminuted fine enough to renew it's Courſe, the Veſſels will recover their Strength and Elaſticity, and the Diſeaſe will be wholly removed.

521. *Moreton* *, one of the beſt Writers in this Caſe, tells us, that, for the moſt Part, theſe Tubercles of the Lungs are glandulous Tumours of a chronical and cold Nature,

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* Vide *Phthyſiologia*.

and ſomewhat like *King's-Evil* Swellings, having their Original from the Glutinouſneſs of the Humours, or from an Obſtruction of the Pore or Duct of the Glandules. Hence, and from the Arguments adduced, we think it reaſonable to conclude, that the Method we have laid down, is the only rational one, and moſt likely to be ſucceſsful: And if near twenty Years Experience may be allowed as a Witneſs, I can ſolemnly aver, that I have always found it ſo.

522. If, therefore, this be true, what muſt we think of thoſe who rely intirely upon the *teſtaceous Powders, Aſſes' Milk, a few pectoral Medicines, and the Bark,* when the Fever becomes putrid, and mimicks an *Intermittent.* The ſad *Prognoſtics* they make, of *confirmed hectic Fevers,* may well be verified, when they preſcribe only ſuch *inſignificant* or *dangerous* Medicines; and this is well known to be ſo common a Practice, that whenever a Patient dies under a decent Courſe of *ſweetening Powders, and Aſſes' Milk, a few Lozenges for the Cough, and a pectoral Drink to nouriſh him*; his Relations are well ſatisfied, believing all was done for him, that could poſſibly be done, and that they loſt their Friend according to the *ſtricteſt*

Rules of Phyſic, as well as the *eſtabliſhed Laws of Nature.*

523. I ſhall beg Leave to ſubjoin one Example of this kind of Practice, which, though it was not a *pulmonary Conſumption*, may ſerve to illuſtrate, in a very particular Manner, the Truth of our Theory, and the Uncertainty of thoſe who preſume to preſcribe without knowing the Seat of the Diſtemper, the Cauſes of the Symptoms, or the Means by which Medicines produce their ſeveral Effects.

524. A *Gentlewoman*, aged 36, of a full Habit of Body, and of a ſanguine Conſtitution, was ſeized with a Pain in the lower Part of the right Side of her Belly, ſome Time after a hard Labour, which continued more or leſs for ſome Months, and then went off without the Application of any Medicines. About four Years afterwards the Pain returned (without being with Child from one Time to the other) with more Violence than at firſt, and was then attended with a *hectic Fever*, which ſometimes appeared in the Shape of an *Intermittent.* Upon this, a *certain Practitioner* in the Country was conſulted, who immediately preſcribed the *Bark*, without any other Preparation than a ſingle

Purge of *Decoct. Sennæ*, &c. and though the Pain and Fever both increaſed, he perſiſted in the Uſe of the *Cortex* for more than ſix Weeks. After this he put her into the Courſe of the *teſtaceous Powders*, and *Aſſes' Milk*, which ſhe continued near four Months.

525. The poor Woman labouring under a Deal of Pain, was, at laſt, perſuaded to change her *Phyſician*; but the Obſtructions were ſo firmly riveted, by an unſkilful Adminiſtration of the *Cortex*, &c. that all that could then be done by *Bleeding*, *Purging*, *attenuating* and *deobſtruent Medicines*, was to no Purpoſe: The Tumour came to Suppuration, a vaſt Abſceſs was formed, and the Woman died. But to proceed;

526. Great Regard, during the whole Cure, is to be had towards the *Non-Naturals*; for, without a careful Ordering, and a cautious Uſe of them, the moſt noble Remedies will not avail. Nothing, therefore, is to be allowed of by way of *Eating* and *Drinking*, which is hard of Digeſtion, or that will, by any Means, create a groſs, viſcid Blood, or heap up in the Humours too many excrementitious Particles: For when the digeſtive Faculties are weak, we cannot take too much Care in contriving

Food of good Nouriſhment, and of eaſy Digeſtion. A bad Concoction in the firſt Paſſages is not to be remedied in the ſecond; eſpecially where the Lungs are diſordered, and the vital Vigour of their Veſſels decayed: For ſince the Chyle, or animal Emulſion, is to undergo a Sort of a ſecond Digeſtion in the Lungs, by the Preſſure of the Air, and the impetuous Motion of the Blood through them, it is not reaſonable to ſuppoſe that a viſcid, coarſe Chyle can be properly comminuted, divided, aſſimilated, and intimately mixed with the Blood, ſo as to be fit for Nouriſhment, or to paſs freely through the minuteſt *Tubuli*, when the Action of the Lungs is depreſſed, or any of their Organs are faulty.

527. Hence it is much ſafer to give what the concoctive Faculties can digeſt with Pleaſure, than to give what equals or exceeds their Strength, either in Quality or Quantity: For a large Quantity of the moſt innocent Chyle being haſtily poured into the Lungs, when faulty, will render the Circulation through them ſtill more uneaſy, and create *Heat*, *Fluſhings in the Face*, a *Cough*, &c.

528. For theſe Reaſons, therefore, the *white Meats*, ſuch as *Chickens*, *Veal*, *Rabbits*, *Calves' Feet*, &c. are to be allowed of, in ſmall Quantities. *Fiſh* which are ſmooth, are alſo very good, *viz.* *Plaice*, *Whitings*, *Soals*, *Flounders*, *Cray-Fiſh*, &c. But when the Stomach is ſo far impaired as not to be able to digeſt theſe Things, we muſt have Recourſe to the moſt mild and balmy Food; ſuch as *Jellies*, *Milk*, *Snails*, *Chocolate*, *Sago*, *Sallop*, *Rice*, *Turneps*, *Aſparagus*, *Viper-Broth*, and *new-laid Eggs hot from the Hen*.

529. Nothing can be more innocent and nutritious than new-laid Eggs, eſpecially their *Whites*, which, in every Reſpect, tally with the Qualities of the *Serum* of the Blood *; and therefore no Diet can be more proper to repleniſh a decayed Conſtitution with kindly Juices, where the Organs of the firſt and ſecond Digeſtion are impaired, than the *Whites* of new-laid Eggs diſſolved in a Draught of warm *Barley-Water*, or in any other convenient Vehicle: For nothing is more free from Acrimony, or more capable of correcting that Diſpoſition in conſumptive Fluids; and nothing is more eaſily aſſimilated into Blood, and nutritious Juice.

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* Vide *Barry*'s *Treatiſe of Conſumptions.*

530. As to *Drinks*, proper for *hectic People*, with *Tubercula* in their Lungs, they ought to be ſuch as will cool, dilute, diſſolve, nouriſh, and free the Blood and Humours from Acrimony, without leaving behind them a glutinous, viſcous *Reſiduum*, and without being apt to create inteſtine, fermentative Motions in the Blood, which only augment it's Heat, without contributing towards reſolving the Obſtructions.

531. Hence all *Malt Liquors*, however mild, muſt needs be pernicious, as they are glutinous, and very fermentative; and, conſequently, apt to relax the Veſſels, as well as to excite Heat, and increaſe the Viſcoſity of the Humours.

532. If the Pulſe are not too full, if there be no ſpitting of Blood, or Danger of an Inflammation, the *Spaw* or *Pyrmont Water* may be moſt proper Drinks, as they attenuate, diſſolve, and add to the *Momentum* of the Blood, without increaſing it's Heat to a great Degree. But if the Habit be too weak to bear the Force of theſe Waters, *Milk-Water* with a few *Snails* in it, *Honey* boiled in Water and ſcummed, old *Malaga Wine* mixed with Water, *&c.* are moſt ſuitable.

533. Proper *Meats* and *Drinks* being agreed upon, the next Thing to be adviſed, is *Exerciſe*; which, if duly followed, every Day, in a clear dry Air, and in Proportion to the Strength of the Patient, will do Miracles. By a patient and exact Obſervance of the *diætetic* and *gymnaſtic* Rules, a very bad Conſtitution may be reſtored; but then the Sick muſt conſpire with his Phyſician, and ſtrive indefatigably to follow theſe Rules; for if he lets ſlip this golden Opportunity, whilſt he has a tolerable Share of Strength remaining, he may not be able to purſue them as he ought, when, perhaps, he moſt earneſtly deſires it.

534. Frequent Experience, as well as Reaſon, teſtifies, that *riding on Horſe-back* is the beſt Exerciſe in the World; it preſerves thoſe who are in Health, it comforts and ſtrengthens the Weak and Diſpirited, it attenuates the animal Juices, and adds freſh Vigour and Elaſticity to the whole Syſtem of Fibres, by giving a moſt agreeable Motion to every Part of the Body, at the leaſt Expence of Spirits. And in *hectic Fevers*, the frequent little Jolts, or the repeated gentle Concuſſions which are given to the Body, will vaſtly contribute towards diſlodging the

Obſtructions. Hence *Sydenham* ſincerely aſſerts, that *Mercury* in the *French-Pox*, and the *Jeſuit's Bark* in *Agues*, are not more effectual than the *Exerciſe* above-mentioned in curing *Conſumptions.*

535. The *Choice of Air* alſo is a very weighty Concern, and oftentimes a neceſſary Part of Advice: For the Lungs being of a lax, delicate Texture*, with a Surface of a larger Extent than of the whole Skin expoſed to the outward Air, and of a much hotter Temperature, muſt be extremely ſenſible of the Qualities of the outward Air, and affected by them as by outward Contact; therefore the Choice of Air to People of tender Lungs, is a Matter of great Importance: *Firſt*, as to Humidity, the leaſt Quantity of it muſt produce a Cough; as for hot Air, the Lungs cannot bear Air that is hotter than the animal Fluids; Heat and Moiſture together produce Putrefaction; conſumptive People often die in a hot Day: But thoſe two Qualities ſeldom reſide long in the Air together. It ought likewiſe to be conſidered, that heating Rooms by any Contrivance which does not let the Vapours eſcape, may be dangerous to the Lungs:

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* Vide *Arbuthnot* of *Air*.

On the contrary, Air intenſely cold, by it's Contact, may condenſe and coagulate the Blood, through the thin Coats of the Veſſels, ſo as to produce Inflammations which reign here in the Winter, and in many Countries upon cold Blaſts. Dry Air, and not intenſely hot, muſt be favourable to the Lungs; accordingly Countries, where the Air has thoſe Qualities, are pretty free from pulmonic Conſumptions, and ought to be preferred by thoſe who are already ſeized with that Diſtemper.

536. Above all Things, adviſe your Patients to be chearful; for there is nothing that unbends the Spring of the Solids, and confirms the Diſeaſe, more than *Grief* and *Sadneſs*. We come now,

537. *Secondly, To the Cure of hectic Fevers, which ariſe from Obſtructions in the Viſcera of the lower Belly.* And here we ſhall be very brief, by Reaſon the *Indications of Cure* are very much the ſame with thoſe already taken Notice of: *Bleeding*, *lenient Clyſters*, and *emollient*, *cooling*, *diluting Medicines*, take Place whilſt there is any *Inflammation*, or *acute Pains*; and after that, ſuch Medicines as attenuate, grind, and comminute the viſcous Humours, abſorb the

acrid, ſaline, corroſive Particles, and add to the *Momentum* of the Blood, are moſt adviſeable. The only Difference is, that here we may be more free with *active*, and *ponderous* Medicines, than we could in a *pulmonary* Conſumption; becauſe the Veſſels which conſtitute the *Glands* of the *lower Belly* are larger, and ſtronger, than thoſe which make up the *pulmonary Glands*; and, conſequently, they are not ſo liable to burſt, or to be inflamed.

538. *Mercurial Purges*, or *Mercurius Dulcis* mixed up with the *Gums*, in ſmall Quantities, ſo as not to run off too haſtily through the firſt Paſſages, are the moſt effectual Medicines to begin with; eſpecially if the *Tumour* be diſpoſed to terminate in a *Scirrhus*, or where an eroding Acrimony is joined with the Viſcidity of the Humours.

539. *Oxymel Scylliticum*, either as an *Emetic*, or corrected into an *Alterative*, is oftentimes of great Uſe in reſolving Obſtructions, and deterging the *Viſcera* of the *lower Belly*.

540. The *Sapo Venet. Millepedes, Sal Tartar. Sal vol. Succini, Æthiops Mineral, Chalybs cum Sulph. ppt. Cinnab. Antimon. Cinnab. Nativ. Rad. Curcum. Rub. Tinct.* &c. are

the Medicines to be depended upon, in order to attenuate the groſs, tough, glutinous Matter adhering to the Sides of the Veſſels, and obſtructing the ſecretory and excretory Ducts of the Glands.

541. The learned *Boerhaave* * aſſures us, where there is no Inflammation, or Tendency to an alkaline Diſpoſition of the Humours, that *Soap*, rightly prepared, without *Lime*, is one of the moſt pure and excellent Medicines we poſſeſs; the numerous Virtues whereof may eaſe the Phyſician, who is acquainted with them, of a great Load of Simples of much leſs Efficacy. It is an univerſal *Deobſtruent*; or good for all Obſtructions ariſing from an Exceſs in the Diameter of the obſtructing Matter above that of the Canal through which it ought to flow. If we conſider what Kind of Matter it muſt be that cauſes Obſtructions in the Body, we ſhall find that *Soap* is admirably ſuited to diſſolve it's Texture, and force it a Paſſage with the circulating Fluids. Now, it can only be the more groſs and viſcid Parts of the Fluids themſelves, which, coming together, fall into Coheſion, and block up the Cavity of the Veſſels: But all the animal Fluids conſiſt

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* Vide *New Theory of Chemiſtry.*

of nothing more than Water, Salt, Oil, and Earth; of all which none is more apt to ſtick than the Oil, upon the Account of the ſuperior Tenacity of it's Parts, and it's Indiſpoſition to diſſolve, like Salt, in Water. And in Effect, we ſeldom find that Earth is the Cauſe of Obſtructions in the Body; but an unctious Matter that ſometimes appears like Chalk, ſometimes like Roſin, and ſometimes like an oily Subſtance; all which are incapable of being diſſolved by Water, and hardly by common Salt, but readily yielding to fixed Alkali and Alcohol; the former whereof, however, might firſt corrode the Veſſels of the Body before it reached the Part, whilſt the latter would coagulate the Fluids contained therein, and by conſtringing the Veſſels increaſe the Obſtruction, at the Time they produce the other Effect: So that *Soap* is the only Remedy which can be uſed with Safety and Succeſs in the Cure of Obſtructions. And this will preſently, and effectually, diſſolve away inſpiſſated and hardened, or pitchy, unctious Matter, unite it to itſelf, and fit it for Expulſion, or a free Circulation in the Canals again; and all this too in a Manner as mild and gentle as it is effectual.

542. The *Aliment* proper for Perſons in this Diſorder, are the ſame with thoſe abovementioned; and *Riding* is peculiarly excellent in removing Obſtrüctions in the lower Belly. We ſeldom obſerve thoſe who ride much, to have large Bellies, or to be afflicted with the *Dropſy*, *Jaundice*, *Spleen*, or any other Diſtempers ariſing from *meſenterial* Obſtructions. And another remarkable Thing is, that the *Legs* of thoſe who ride very much, are generally ſmall, and ſcarce ever ſwell; which further ſhews how much this Exerciſe braces up the Fibres, and attenuates the Fluids.

543. Theſe Things being properly obſerved and continued, will ſeldom fail of curing *hectic Fevers*, if they are taken in Time, before the conſtituent Veſſels of the obſtructed Glands are broken or have quite loſt their Tone; or before the animal Fluids are too much corrupted and depraved. But when the Conſtitution both of the Solids and Fluids, is vaſtly impaired, when Apoſthemations and Abſceſſes are already formed, and ſanious purulent Matter is continually diſcharged from the Mouths of the ruptured Veſſels; the Abſceſſes or Impoſthumations muſt neceſſarily break, and the Wounds

will ſoon degenerate into putrid Ulcers, from the Acrimony of the Humours; and then the Medicines above-mentioned, will not avail, neither indeed have we much Reaſon to expect that any others ſhould: But ſince there have been ſome Inſtances of Succeſs, even when Things have come to this Paſs; we undertake,

544. *Thirdly, To lay down the moſt probable Method of relieving Ulcers in the Lungs, or in any internal Part of the Body.*

545. If we maturely conſider how far the Strength, Vigour, and Elaſticity of the animal Fibres is decayed, and how much the *Craſis* of the Blood is degenerated from a ſmooth, mild, balſamic Liquor; if we conſider the Situation of the Ulcers, the membraneous or veſiculary Compoſition of the Parts, the Delicacy of the *Fibrillæ* which are broken, corroded, and eaten away, and the Acrimony of the Humours flowing to them; and, *laſtly*, if we conſider how much the Parts are ſtretched and diſtended, and how thick, hard, and ſcirrhous their ſeveral Veſſels and Membranes are rendered, by the Acridneſs of the Juices, and the Appoſition of new and foreign Particles; it will manifeſtly appear to require the utmoſt Skill in

the *Phyſician*, as well as the greateſt Courage and Reſolution in the *Patient*, to be ſucceſsful, even where internal Ulcers are ſmall and benign.

546. *Ulcers* are more or leſs dangerous according to the Nature of the Part they are ſituated in: Thus Ulcers in the *Lungs* are moſt dangerous of all, by Reaſon their looſe, ſpongy Texture; and their continual Motion, renders all Solutions of their Continuity almoſt impoſſible to be healed. Ulcers in the *Kidneys* or *Bladder* are alſo extremely difficult to cure, becauſe of the continual Flow of Urine through them, which inceſſantly irritates the Mouths of the ruptured Veſſels, prevents the Appoſition of nutritious, healing Particles, and renders the Lips of the Wounds hard and ſcirrhous. Ulcers in all other Parts of the Body are more or leſs dangerous, according as the Part is more or leſs vital, more or leſs nervous, and has a greater or leſſer Flow of Humours to it.

547. But, however, ſince the moſt delicate *Fibrillæ* of the Body, are well known to ſend forth a proper Cement, or a *Pituita*, or *Mucus*, which ſerves to elongate their broken Ends, and to unite them when there is a Solution of Continuity; it behoves us to

aſſiſt *Nature* in this great Undertaking, and to contribute, as much as poſſible, towards a Coalition of the broken Fibres.

548. From what has been ſaid, and from the eſtabliſhed Laws of the animal Oeconomy, it obviouſly appears, that the *Cure* of all *internal Ulcers* conſiſts in preventing too great an Afflux of Humours to the affected Part; in deterging and cleanſing the Mouths of the broken Fibres; in keeping the Part, as much as poſſible, in a State of Reſt; and in diſpoſing all the Humours which arrive there, to be mild, ſmooth, and balſamic.

549. *Firſt*, then, ſince Experience informs us, that Ulcers cannot be healed whilſt they ooze out a great Deal of acrid, corroſive Matter, it ſeems moſt rational to begin the Cure with moderate *Revellents*; or by gently drawing away, by *Stool*, ſome of the morbid Matter. *Calomel*, in ſmall Doſes, is generally eſteemed the beſt Medicine to prevent the Defluxion of Humours, and to carry off ſharp, acrid, ſaline, corroſive Particles from the Blood: But then it ought to be exhibited in the very Beginning of Ulcers, or whilſt the Patient has a tolerable Share of Strength remaining; or otherwiſe, ſuch forcible Me-

dicines may further decay the *Vis Vitæ*, and aggravate the Complaints.

550. *Iſſues* may be ſerviceable, by making a gentle Revulſion from the ulcerated Part, and by draining from the Blood a Portion of the ſharp, irritating Particles, which retard the Healing of the Ulcers.

551. *Secondly*, The Medicines in common Practice, for deterging, and digeſting of Ulcers, are *Balſam. è Meccâ, Balſ. Peruv. Balſ. Copivi, Balſ. Tolut. Gum. Galban. Myrrh, Aloes, Oliban. Maſtic. Tereb. Ven. è Chio*, &c. mixed with the Yolk of an Egg, or made up into Pills, and exhibited with a vulnerary Decoction of *Fol. Tuſſilag. Hæder. Terreſt. Scabioſ. Capil. Ven. Flor. Bellid. maj. Hyperici, Rad. Altheæ, Glycyrrh. Conſolid. maj.* &c.

552. *Thirdly*, In Ulcers of the Lungs, *Opiates* are ſometimes uſeful, to abate the Cough, and to give ſo much Reſt to the ulcerated Parts, as to allow Time for the purulent Matter to be well digeſted, and for the nutritious Particles to fix themſelves: But they generally leave ſuch a Lowneſs and Depreſſion behind them, when their Force is worn off, that it would be dangerous to repeat them often.

553. *Fourthly*, All violent Exerciſe, or ſtrong Motions are to be avoided; and therefore ſome Amuſement or Entertainment of the Mind ſhould conſtantly be invented: For the Entertainment of the Mind, and keeping it agreeably diverted from reflecting on it's Misfortunes or Miſeries, is of great Uſe; whereas Anxiety and Concern depreſs the Spirits, and weaken the Body.

554. *Fifthly*, To obtund the Acrimony of the Fluids, and to fill the Blood with ſoft, ſmooth, nutritious, balſamic Particles, *Vipers, Snails, Whites of Eggs, Juice of Turneps, Rad. Chin. Eryngo*, &c. are calculated; which not only nouriſh, but ſoften and take off the Sharpneſs and Acrimony of the Humours: They alſo contribute to re-unite the broken Fibres, and to heal up the Ulcers, by rendering the animal Juices ſweet, ſmooth, and conſolidating. They afford a Kind of natural Balſam, fit to ſuſtain and connect the new ſucceeding Fibres, without which no Ulcer can ever be healed.

555. *Laſtly*, The Choice of Diet is of the greateſt Importance to ſuch as have internal Ulcers; it being evident that the Aliment ought to be ſuch as requires the leaſt Force to convert into Blood and animal Subſtances:

For ſuch as have an imperfect Circulation through any Organ of the Body, ought to take the greateſt Care not to charge their Veſſels with groſs and much Matter. Let us add, that Nutrition being performed in the ſmalleſt vaſcular Solids, it requires the moſt ſubtile Matter, and is the moſt perfect animal Action.

556. *Milk*, therefore, is univerſally eſteemed the beſt Reſtorative, it being Chyle already prepared, and moſt eaſily aſſimilated into Blood, and converted into Nouriſhment. All Milk is of a ſoft, cooling, nouriſhing Nature, putting the leaſt Streſs upon the ſeveral Organs of the Body to digeſt it, and affording as few excrementitious Particles as can be: But, above all, *Women's Breaſt-Milk* is moſt to be depended upon, and has raiſed many People from the moſt deplorable Conditions. * The Milk drawn from the *Breaſts of Women* is the ſweeteſt; the neareſt whereto is *Aſſes' Milk*, which, indeed, has a ſaccharine Sweetneſs, and comes almoſt up to the human. This is ſucceeded in Virtue and Goodneſs by that of *Mares*, which is better than that of *Goats*; yet even this exceeds

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* Vide *Boerhaave*'s *Chemiſtry*.

that of a *Sheep*, as theirs does that of *Cows*, which is the coarſeſt of all.

557. Hence *Milk* is moſt fit to repair the greateſt Decays of conſumptive People, and to recruit their exhauſted Spirits; and ought always to be drank warm as it comes from the Body, before the ſpirituous *Gas* evaporates, and flies off.

CHAP. X.

Of the Antecedents *to a* ſlow FEVER.

558. ALL *medical Writers* hitherto, have treated of *ſlow*, or *nervous*, and *malignant Fevers*, as one and the ſame Diſeaſe, notwithſtanding many of the *antecedent Cauſes*, and the *diagnoſtic Phænomena* vary ſo eſſentially from each other, that different Opinions have ariſen in regard to the Appellation of the Diſeaſe; ſome chuſing to call it *ſlow*, by reaſon of the *mild Heat*, *weak*, *low*, *ſlow Pulſe*, *cold*, *clammy Sweats*, &c. Others are of Opinion, that it deſerves the Title of *Nervous*, becauſe of the *Languor*, or *Proſtration of Spirits*, the *ſudden Decay of Strength*,

Strength, *tremulous Nerves*, *ſubſultory Tendons*, &c. And there are others who are well aſſured it deſerves the Name of *Malignant*, from the manifeſt Proofs we often meet with of *Putridity* or *Malignity* in the Humours. For my Part, I have many Reaſons to convince me that there are *Fevers* which ariſe merely from a *Paucity of animal Spirits*; from ſome Obſtruction to the Secretion in the Brain, or from too profuſe a Diſcharge of this vital Fluid, after it is ſecerned; and that theſe Fevers ſometimes run out great Lengths without exhibiting the leaſt Signs of *Putridneſs* or *Corruption* in the Blood. Whereas others are ſeized, from the very Beginning, with an *alkaline* Corruption, or *Malignity* in the Humours; which diſſolves the red Globules, creates an inteſtine fermentative Motion in the animal Fluids, and renders them ſharp, acrid, and corroſive.

559. In the *former*, ſome Parts of the Blood run into unnatural Coalitions and Grumes, whilſt others are broken down and diſſolved for Want of ſufficient Motion and Heat to preſerve their *Craſis*.

560. In the *latter*, the Blood and Humours are too thin and dilute, from the

Action of volatile, acrid, alkaline Salts and Oils, which diſſolve the Band of Union between the ſeveral Orders of Blood-Globules, and reduce them too ſmall to ſubſerve the Purpoſes of Life.

561. It is for Want of this Diſtinction that we meet with ſuch various and inconſiſtent Directions relating to the Cure of *ſlow*, and *malignant Fevers*: In one, *alexipharmic*, *volatile*, *attenuating Medicines* ſeem to be moſt proper; whilſt in the other, *acid*, *abſorbent*, and *moderately aſtringent Remedies*, moſt certainly take Place. So that, conſequently, where the *Theories* of theſe Fevers, and the *Methods of Cure*, are promiſcuouſly treated of, *young Students* muſt neceſſarily be confuſed, and not capable of determining which Remedies are moſt applicable, till, by a patient and diligent Obſervance of the various *Phænomena*, they make themſelves Maſters of what was not to be learned from Books.

562. For theſe Reaſons, therefore, I have thought it proper to make a Diſtinction between *ſlow* and *malignant Fevers*, both in the *Theory* and *Practice*, and hope with Emolument. Thoſe who are averſe to this Diviſion, and think it trifling and uſeleſs,

may, if they pleaſe, blend the following Chapters together, and reduce them back again to one Diſeaſe. Proceed we to the *Antecedents* of *ſlow* Fevers.

563. I. Whatever prevents a proper Recruit of animal Spirits, hinders or impedes their Secretion, abſorbs or fetters them when ſecerned, or exhauſts, or evaporates them in too great Quantities, will neceſſarily rebate the vital Vigour of the Body, the Velocity of the Circulation, and the Heat of the Blood: Hence *living too low*, or upon *Food of too little Nouriſhment*, may be very pernicious.

564. *Hippocrates* * aſſures us, that the Conſequents of a ſlender Diet are more fatal than one that is more plentiful. The latter may be remedied either by Exerciſe, or gentle Evacuations; but the Decay of Strength, the Laxity of the Veſſels, and the Poverty of the Fluids, the natural Conſequents of too ſpare, or too poor a Diet, are not ſo eaſily repaired.

565. It is eaſy to apprehend, that if the Aliment does not repleniſh the Blood and Juices with nutritious Particles in Proportion to the Waſte which is daily made by the

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* Vide *Aphor.* 5. Sect. 1.

ſeveral Excretions, the *Vis Vitæ* muſt neceſſarily decay, and the ſeveral Series of Veſſels and Fibres will grow thinner and weaker; in Conſequence of which, the Velocity of the Circulation will be rebated, the Fluids will run into unnatural Clots and Grumes, the Secretions will be diminiſhed, and Obſtructions will be generated in ſome of the minuteſt *Tubuli*.

566. If the Laxity of the Veſſels be very great, and the vital Heat ſunk much below it's healthful Standard, ſome Parts of the animal Fluids may thence be liquified, and the natural Conſiſtence of their Parts diſſolved. For, ſince Heat, much above the natural Standard, or above a *hundred Degrees*, will tend to inſpiſſate the animal Fluids; it is as certain, that too little Heat, or Heat below *eighty Degrees*, will incline the Blood and Lymph to be thinner than they ought to be. *Ninety-two* Degrees of Heat in the Blood (as we have obſerved above) is found to be the Standard which preſerves the animal Juices in that Conſiſtence, which beſt ſubſerves the Purpoſes of Life.

567. Hence living too much upon *Vegetables*, eſpecially *Cucumbers*, *Melons*, *Muſhrooms*, *Lettuce*, and all thoſe abounding with

cold, viſcid Juices, may be hurtful to ſome Conſtitutions, by thickening, and bringing a *Lentor* upon the animal Fluids, and thereby hindering *Perſpiration*, &c.

568. II. *An immoderate Uſe of Venery* may ſo far debilitate the Nerves, unbend the Spring of the Solids, and depauperate the Blood, as to bring on a *ſlow* Fever.

569. III. This Diſeaſe is alſo apt to ſucceed the Courſes which are generally gone through in *venereal Caſes*; for *Mercury*, in large Doſes, and long continued, is very prejudicial to the Nerves.

570. IV. Thoſe of originally weak Nerves, or thoſe who have formerly been oppreſſed, and ſunk by Illneſſes, are obſerved to be moſt liable to *ſlow Fevers*: For ſince their Fibres are lax, their Digeſtion weak, and their Circulation ſlow, it muſt conſequently follow, that an Abuſe of the *Non-Naturals*, or any accidental Alteration in them, will ſooner ſpoil their Blood and Humours, and render them viſcid and ill-conditioned, than in thoſe whoſe Organs are ſtrong, and their Blood duly fluxile.

571. V. *Too copious a Diſcharge of the moſt ſubtile Parts of the animal Fluids* may

occaſion *ſlow Fevers.* Dr. *Lobb* * ſuppoſes that the *nervous Tubuli* which terminate either in the internal or external Superficies of the Body, are deſigned by Nature to throw off ſome recrementitious Matter from the nervous Juice, as well as to be the Organs of Senſation. If, therefore, this be true, as it is reaſonable to believe, it will evidently appear, that when the Extremities of the Nerves are relaxed, or more than ordinarily dilated, they may let fly, not only the excrementitious, but the moſt uſeful and neceſſary Parts of the animal Spirits; and conſequently ſuch an Evacuation may be more detrimental to the Conſtitution, than an Exceſs in any other Excretion.

572. VI. To conclude this Chapter, it is ſufficient to obſerve, that whatever will vitiate and impoveriſh the Blood, by rendering ſome Parts of it more groſs and thick, and others more fluid than natural; or whatever will diminiſh the Secretion in the Brain, or by any other Means enervate the Fibres, and render them too flaccid and relaxed, may be the *antecedent Cauſe* of this Diſeaſe.

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* Vide *Rational Methods of curing Fevers.*

CHAP. XI.

Of the Riſe *of the moſt uſual* Symptoms *incident to a* ſlow FEVER.

573. I. A *Rigor*, or cold *Shudderings*, which ſometimes return many Times in a Day at great Uncertainties. For, as Obſtructions happen to be generated in the capillary Veſſels, by thoſe Corpuſcles of Blood and Lymph which are aggregated, through the Slowneſs of their Motion, in Grumes too large to paſs freely through the *Arteriolæ*, they irritate the adjacent nervous *Fibrillæ* into frequent Vibrations; which being communicated from Part to Part, oftentimes become general, and are no more than ſo many Efforts of Nature to remove the *Impedimenta*, and to diſlodge the Obſtructions.

574. II. *Frequent Inclinations to vomit*, from a Deal of cold, viſcid, phlegmy, pituitous Matter thrown into the Stomach, by Reaſon of the great Laxity of the Ducts which open into it's Cavity.

575. III. *A low, quick, unequal Pulſe,* moſt commonly attends this Diſeaſe: For as the *Craſis* of the Blood is vitiated, the Secretion in the Brain diminiſhed, and the Fibres are too lax; conſequently their Impulſes will be weak, and the Expulſion of the Arteries outwards but faint: And as the Obſtructions in the capillary Veſſels happen to alter the Flow of the Blood and Spirits to the Heart, the Pulſe will be quicker or ſlower, or more or leſs unequal, proportionate thereto.

576. IV. *The Heat is but mild:* For ſince the Fibres are greatly relaxed, and the tranſverſe Sections of the ſeveral Series of Veſſels widened; the Friction of the Blood-Globules, both againſt the Sides of the Canals, and one another, will be leſs than uſual, and conſequently the Heat of the Body will be but moderate.

577. V. It ſometimes happens that the *Extremities* are *cold*, whilſt the Patient complains of an *inward Heat*; the Cauſe of which may be eaſily apprehended, if we conſider that the Legs and Arms are at the greateſt Diſtances from the Heart, and conſequently the Motion of the Blood will be ſloweſt there: And if the capillary Veſſels

towards the external Superficies of the Body happen to be obſtructed, or to give more than uſual Reſiſtance to the Circulation, the Blood may be, by that Means, ſo much accumulated in the inner *Viſcera*, as to occaſion great Uneaſineſſes, and Heat; though, at the ſame Time, the Hands and Feet feel cold, like a dead Carcaſe.

578. VI. The protruſive Force of the Blood being but weak, and the ſecretory and excretory Ducts of the ſubcutaneous Glands being greatly relaxed and widened, *cold* and *clammy Sweats* are apt to break out in the Beginning of this Diſeaſe, which are only *ſymptomatical*, and very prejudicial: For ſince the morbid, moſt viſcous Matter of the Blood is not, as yet, prepared for a *critical* Diſcharge; and as the Sweats conſiſt of ſoft, ſmooth, oleaginous, nutritious Particles, they muſt neceſſarily enfeeble the Body, and retard the *Criſis*.

579. VII. The *Thirſt* is ſeldom very troubleſome; by Reaſon the Heat is but moderate, and, conſequently, a leſs Quantity of *Saliva* will ſerve to moiſten the *Fauces*, &c.

580. VIII. *Frequent Sighings*, with an Oppreſſion on the *Præcordia*, are pretty conſtant *Concomitants* of this Diſeaſe; from

the Power of the Muſcles ſerving towards Reſpiration being rebated, and from the *Lentor* obſtructing in the capillary Veſſels, and reſiſting the protruſive Force of the Blood through the Lungs, *&c.* whereby it's Motion becomes more difficult, and a heavy Load ſeems to preſs upon the Breaſt, which the Sick is oftentimes endeavouring to remove by deep Inſpirations.

581. IX. The *Urine* is generally *limpid* and *clear*, in the *Beginning* of this Fever, by Reaſon the Salts and Oils are not attenuated and ground fine enough to be ſecerned by the *renal Tubuli.* Towards the *ſtationary Period*, it moſt Times grows turbid, and let's fall a Sediment; but it is ſeldom or never intenſely red or high-coloured.

582. X. In the *Height* of this Diſeaſe, when the animal Spirits are moſt deficient, a *Stupor*, *Subſultuſes*, &c. ſometimes ſeize the Patient, and continue for ſome Days.

583. Theſe are the Symptoms which I have obſerved to attend ſome *ſlow Fevers*, which have laſted 20 or 30 Days, and where I have met with no *Phænomena* to indicate, nor have had the leaſt Reaſon to ſuſpect a Corruption, or Putrefaction, or Malignity in the Humours; but only a viſcid State of

ſome Parts of the Fluids, and too great a Thinneſs in others; as muſt neceſſarily happen when ſome Parts of ſo heterogeneous a Fluid as the Blood, are ſuffered to obey their own proper Laws of Attraction, and unite into Clots; whilſt the moſt fluid Parts are ſqueezed out, for Want of a proper Degree of Motion and Heat to preſerve their *Craſis*.

584. But whenever the Symptoms are more deſperate than what I have here mentioned, and the vital Vigour of the Body ſeems to decay beyond what we could reaſonably expect; there may then, perhaps, be too much Ground for us to ſuſpect an alkaline, putrid, corrupting Diſpoſition in the Blood and Humours, which will not only occaſion different and more direful *Phænomena*, but require a different Method of Cure, as we ſhall ſhew in the Sequel of theſe Papers.

CHAP. XII.

Of the Cure of a ſlow FEVER.

585. FROM the Account we have given of the *Antecedents*, and *Symptoms* of this Diſeaſe, I think it pretty evident that the *Cure* conſiſts in attenuating, diluting, and diſſolving the *Moleculæ* obſtructing the free Courſe of the Blood and Lymph through the capillary, ſanguine, and lymphatic Arteries; to rouze the weak and languiſhing Fibres into quicker and ſmarter Vibrations, in order to recover the healthful *Craſis* of the Blood; and to caſt out of the Body the morbific, worn-out, uſeleſs Particles of the animal Fluids, by the moſt pervious and patent Outlets.

586. As to Evacuations, *Vomits* are the only ones to be depended upon in the *Beginning* of *ſlow Fevers*: For as they throw off a Deal of viſcid, phlegmy, pituitous Matter from the Stomach, without draining from the Blood any Thing that is uſeful; and as they agitate and ſhake the Veſſels, and increaſe their Vigour, they muſt neceſſarily

contribute largely towards reſolving the *Lentor*, and removing the *Nauſea Ventriculi.*

587. *Bliſters* are exceedingly proper, and ought never to be neglected throughout the whole Courſe of this Diſeaſe. In the *Beginning*, they are uſeful in ſecuring the *nervous Syſtem*, and preventing *Convulſions*, *Deliria*, &c. In the *Increaſe*, they greatly maintain, ſupport, and preſerve, the Springineſs and Elaſticity of the Fibres, ſo that they do not ſink under their Load before the *Lentor* is attenuated, and prepared fit for Excretion, or to paſs freely through the vaſcular Frame. And in the *Height* of the Fever, they further comminute the febrile Matter, and ſupport the Tone and Vigour of the Veſſels; whereby they greatly contribute towards excreting the morbific Particles. Thus bliſtering Plaiſters are to be ſhifted from Place to Place, as they dry up, and as the *Phænomena* require.

588. *Sweats* are not to be incouraged in the *Beginning*, and *Increment* of this Diſeaſe: For ſince it is the Nature of the ſubject Matter to deſpume but ſlowly; that is, ſince the *Criſis* of a *ſlow Fever* requires many Days to bring it to Maturity, we muſt not be too haſty in forcing it by hot, acrid, volatile,

pungent Medicines, leſt Nature ſhould be weakened and confounded, by overſtraining the animal Springs, and elongating the Fibres, inſtead of ſhortening and contracting them.

589. *Purges* alſo are detrimental in the *Beginning* and *Increaſe* of *ſlow Fevers*: For daily Experience ſufficiently informs us, that whenever there is a general Relaxation or Flaccidity of the Solids, a Poverty of the Fluids, and a Languor upon the Spirits, the gentleſt purging Medicine creates great Uneaſineſs: And, indeed, if any Excretion be conſiderably inforced, ſome Inconvenience or other will be ſure to ſucceed it, at ſuch Times eſpecially, where there is no morbid Matter fit for Expulſion, nor no critical Diſcharge to be made from the Blood.

590. But, above all Things, be ſure to refrain the Uſe of the *Lancet*, as you value the Life of your Patient, and your own Reputation: For ſince nothing ſo immediately rebates the Vigour of the Fibres; ſince no other Diſcharge from the Blood, lets out the red Globules thereof; and ſince theſe are moſt inſtrumental in maintaining the Heat and Strength of the Body; conſequently

Bleeding is, of all Evacuations, the moſt pernicious in *ſlow Fevers.*

591. As *Purging* has been proved to be injurious in the *Beginning* and *Increment* of this Diſeaſe, we need not therefore be ſollicitous about *Stools*, unleſs the Patient happens to be more than ordinary coſtive; and then the moſt *lenient Clyſters* that can be contrived may be ſufficient.

592. The *Medicines* which I moſt heartily recommend in the *Beginning* of this Diſtemper, are the *Pulv. è Chel. Canc. comp. Pulv. Purpureus, Lap. Contrayerv. Confect. Raleighan. Pulv. ad Guttetam*, &c. with a few Grains of *Saffron* and *Caſtor*, in Proportion to the Weakneſs of the Pulſe, and the Languor of the Spirits.

593. *Sack-Whey, Barley-Water,* with ſome *ſoft agreeable Wine*, or ſome *appropriated Julep*, may ſerve to waſh down theſe Medicines, which ought always to be in liquid Forms, by Reaſon of the Weakneſs of the Stomach, and alimentary Tubes. *Pills* and *Boluſſes* have been known to paſs through the Inteſtines, in extreme weak Caſes, without being diſſolved.

594. But in the *Increaſe*, or rather towards the *ſtationary Period* of this Diſeaſe,

it may be proper to have Recourſe to warmer or more active Remedies, in Order to forward the vital Motions, to undulate and ſtrengthen the Fibres, to attenuate, grind, and comminute the Fluids, and to prepare the peccant Matter fit for ſome critical Diſcharge. Theſe are the *Rad. Serp. Virg. Rad. Contrayerv. Rad. Valerian. Sylv. Decoct. Sacrum in Pharmacop. Fulleri, Lap. è Goâ, Antimon. Diaphor. Bezoar miner. Caſtor. Crocus, Sal Vol. Succini, Sal Vol. Corn. Cervi, Spec. Diambræ, Conf. Raleighana, Alchermes, Sal Vol. Ol. Spt. Corn. Cervi, Spt. Lavendul. Aq. Pæon. & Epidem.* &c. For whenever the nervous *Tubuli*, or animal Spirits ſeem torpid, and want to be excited, theſe Sort of Medicines are of admirable Uſe; and ſhould be continued whilſt any Parts of the Blood remain too viſcous for Want of Motion, and as long as there is no alkaline Acrimony in the Humours, in Hopes of forwarding and promoting a *Criſis*.

595. As to the *Criſis*, we are not to expect it to be by any large or profuſe Diſcharges from the Blood; for ſince there is no real *Plethora*, it does not ſeem to require it: *A ſmall breathing Sweat, a little Hypoſtaſis in the Urine, a looſe Stool or two, or even a ſlight*

a ſlight Diſcharge from an Apoſthemation in the Ear, has been known to avert a whole Train of direful Symptoms. It is ſufficient that the natural *Craſis* of the Blood be reſtored, that the whole vaſcular Frame be rendered duely elaſtic and tenſe, and that all the Secretions and Excretions be performed in a uſual and regular manner.

596. But if there be a peculiar *Idioſyncraſy* in the Patient, or if the morbific, febrile Mattle be ſo tough, viſcous, or obſtinate, as not to give Way to the Efforts of Nature, aſſiſted by the above-mentioned Medicines, in ſome reaſonable Time, the Symptoms will neceſſarily increaſe, and grow worſe, and then we have ſcarce any Chance left for the Recovery of our Patient, but by the Uſe of moderate *purging Medicines:* For ſince the natural Excretions by *Perſpiration, Sweat, Urine*, &c. are diminiſhed, or at leaſt they are not ſufficient to excrete the morbid Matter, this Evacuation ſeems to bid the faireſt at this Time of Day. For though all the bad Symptoms proceed from weak and relaxed Nerves, yet if the febrile Matter be fitted for Excretion, and the *miliary* and *renal* Ducts deny it a Paſſage, however aſſiſted by our Art, the retained Matter will inevi-

tably grow putrid, the vital Vigour will decay, and Death will moſt certainly enſue, unleſs the Body be timely relieved by ſome few *looſe Stools*.

597. Experience aſſures us, that *gentle lenient Cathartics*, rightly ordered, where the morbid Matter is properly attenuated, diluted, and divided fit for Expulſion, are not only ſafe, but neceſſary; and the whole Syſtem of Nerves, inſtead of being weakened, will gain Strength thereby: So that when theſe Fevers have continued for a long Time, and there has been no perfect *Criſis*, they will hardly admit of any other Cure than what is carried on by gentle Cathartics.

598. It ſometimes happens that this Diſeaſe changes into a true and regular *Intermittent*, and gives Way to the *Cortex*, even when there have been little or no Hopes left: But even in ſuch a Caſe, before we venture to exhibit the *Cortex*, we ought to be very ſure that the Intermiſſion is fair, and that we are not deceived by an *Exacerbation* of the Fever at one Time of the Day, and a *Remiſſion* only of it at another.

599. The Conſequence of ſuch a Miſtake would prove fatal; and though the Patient, perhaps, would have died, had not the *Cortex*

been given, yet, ſo cenſorious are the People, it is great Odds but they report it to the Prejudice of the Phyſician. For theſe Reaſons, therefore, I adviſe *young Practitioners* to watch the *Phænomena* moſt diligently, and to obſerve whether the *Paroxyſm* returns at regular and ſtated Times; whether it goes off by Sweat; whether the Pulſe are ſteady and quiet during the Intermiſſion; and whether the Urine grows turbid, or lets fall a laudable Settlement, as is uſual in *Intermittents*: If moſt of theſe Appearance fail, it is, in my Opinion, more adviſeable to continue the Uſe of *moderate Alexipharmics*, till the Intermiſſion is fair, or till the Fever is carried off, than to run any Riſque in adminiſtering the *Cortex*.

CHAP. XIII.

Of the Antecedents *to a* malignant FEVER.

600. I. IT is a common Obſervation that *malignant* or *peſtilential Fevers* ſeldom breed in *cold Weather*, but are gene-

rally the Conſequents of *exceſſive Heat*; and that becauſe of a general Tendency towards Putrefaction in all animal and vegetable Subſtances at ſuch a Time.

601. Hence *Sanctorius* * very juſtly obſerves, that an obſtructed Perſpiration in *Summer*, diſpoſes to *malignant Fevers*; whereas in *Winter* it makes but ſmall Alteration: For Bodies are more ſubject to an Acrimony or Sharpneſs of the perſpirable Matter in Summer, than in Winter Seaſons. For when the Fibres are weak, as in Summer and ſultry Weather, and the perſpirable Matter, by any Cauſe whatſoever, happens to be obſtructed, the Solids then muſt needs be much leſs able to circulate it, and break it ſmall enough for Tranſpiration; and the Heat alſo of the external Air, will favour it's ſooner falling into fermentative and inteſtine Motions, and diſpoſe it thereby to Corruption; from whence will ariſe ſuch as are commonly called *malignant* and *putrid Fevers*. But in cold Weather, both the Conſtitution is better able by Degrees to overcome and wear away ſuch an additional Load, and the obſtructed Matter will beſides not be ſo apt to Putrefaction, but ſometimes

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* Vide *Aphor* xxxv. *Sect.* II.

continue a conſiderable while without any great Injury.

602. *Heat* is well known to excite more than ordinary Vibrations and Agitations in the dulleſt of Matter; ſo that in animal Bodies, whoſe Texture conſiſts of the moſt active, heterogeneous, ſtrongly attracting, elaſtic Particles, it is beyond our finite Capacities to conceive into what Commotion their conſtituent Particles are put, when agitated by Heat; or how ſuddenly their Texture, Bulk, and Figuration are commuted or changed by ſuch inteſtine, fermentative Motions.

603. The Experiment which * *Boerhaave* made by putting a Dog into a Sugar-Baker's drying Stove, the Heat of which was ſo great as to raiſe the Mercury in *Fahrenheit's* Thermometer to an hundred and forty ſix Degrees, does well illuſtrate the ill Effects of very hot Air. After the Dog, ſays he, had been in ſeven Minutes, he panted much for Breath, though he did not ſweat, and in a Quarter of an Hour expreſſed great uneaſineſs; ſoon after which he grew faint, and died in twenty eight Minutes: He drivelled all the Time a great Quantity of red

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* Vide *New Theory of Chemiſtry.*

Foam, which did ſtink ſo intolerably, that a ſtrong labouring Man, who went near it, was almoſt ſtruck down in an Inſtant with this Stench.

604. From this Experiment the *Doctor* obſerves the dire Effects of this Degree of Heat, how ſoon it brought on a moſt acute Diſtemper, with very violent and mortal Symptoms; how ſuddenly the Humours were changed from a healthy to a nauſeous, putrid State, more peſtilential and deadly than the rotteneſt Carcaſe; how greatly the Humours muſt be altered in ſo ſhort a Time, to make the *Saliva* red. He alſo juſtly obſerves, that theſe were not the mere Effects of the Heat of the Stove; for if the Fleſh of a dead Animal had been hung up there, it would have dried, and not have turned to peſtilential Corruption, which muſt, therefore, ariſe from the Friction cauſed by the vital Motion of the Blood in the Lungs; where it being in this Caſe not at all refrigerated, did thereby acquire a greater Heat than that of the Stove; whence it's ſudden Tendency to Putrefaction, the Oils, Salts, and Spirits of the Dog being thoroughly putrefied in twenty eight Minutes. He alſo obſerves, that when a Man breathes an

Air as hot as his natural Heat, he ſoon finds ſuch a Difficulty of Breathing, that he cannot long endure it, but earneſtly pants after cooler Air, which invigorates, while hot Air weakens and diſpirits; for neither Animals nor Plants can long bear a hot Air, without intervals of cool refreſhing Air.

605. Hence it is plain to Demonſtration, that *extreme hot Weather* may diſpoſe to *putrid, malignant Fevers,* by rendering the animal Salts and Oils acrid, and alkaline, and by deſtroying the healthful *Craſis* of the Blood and Humours.

606. II. If the Air be *moiſt* as well as warm, it will render the animal Fibres more ſupple and lax, and ſooner diſpoſe the Humours to corrupt and putrefy: For as *moiſt Air* may help to diſſolve the *Craſis* of the Blood, and to ſpoil it's Conſiſtence, by rendering it too thin and inactive, ſo it may weaken the Action of the Heart, Lungs, and Arteries, and thereby bring on putrid Fevers.

607. III. It ſometimes happens, that the Air is contaminated with ſome certain *Effluvia* which deſtroy the healthy *Craſis* of the Blood, and render *malignant Fevers endemial.* But what theſe *Effluvia* are, whence they ariſe, from what Bodies they are produced,

duced, how they act upon the ſeveral Fluids of the Body, and excite ſuch ſtrange and diſmal Symptoms, ſeems exceedingly hard to determine, and can only be deduced from accurate and diligent Obſervations of their Effects on animal Bodies.

608. It is certain the venomous *Miaſma* wherewith the Air is impregnated at ſuch Times, may paſs immediately into the Blood through the *Vaſa inhalantia* ſituated on the external Superficies of the Body, and the internal Superficies of the Lungs, as well as ſwallowed along with the Aliment; ſo that conſequently the Blood and Humours may be affected in ſuch Seaſons according to the Nature and Properties of the morbid *Effluvia:* And if we may be allowed to gueſs at their Manner of Action, from the Symptoms they produce, it is reaſonable to ſuppoſe, that upon their Mixture with the Blood, a ſort of an Efferveſcence ariſes, or by their ſtrongly attracting and repulſive Power they create more than ordinary Agitations and Commotions in the animal Fluids; in Conſequence of which, Corpuſcles are generated *de novo*, ſome of the Globules coaleſce and form *Moleculæ* too bulky to paſs freely through the minuteſt Veſſels, whilſt others are diſſolved

and melted down, ſo as to be of no further Service to the animal Oeconomy. Hence the Blood is rendered unfit for the Generation of freſh Spirits, the vital Vigour of the Body decays, and the compounding Globules both of Blood and Lymph, are aſſimilated from ſmooth, polite Spherules, into angulated and ſharp-pointed Corpuſcles. *The Languor, ſudden Decay of Strength, Oppreſſion on the Præcordia, colliquative Sweats, Petechial Spots,* &c. ſeem all to prove the Truth of this Suppoſition, as we ſhall ſhew more clearly in the ſubſequent Chapter.

609. *Air* replete with the *Steams of Animals,* eſpecially ſuch as are rotting, has many Times produced peſtilential Fevers in that Place. * The Steams of great Quantities of corrupted Vegetables have produced the ſame Effects in their Neighbourhood. The *Effluvia* of human live Bodies are extremely corruptible: The Water in which human Creatures bathe, by keeping, ſmells cadaverous. And leſs than three Thouſand human Creatures living within the Compaſs of an Acre of Ground, would make an Atmoſphere of their own Steams about 71 Feet high, in 34 Days; which, if not carried away

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* Vide *Arbuthnot of Air.*

by Winds, would turn peſtiferous in a Moment: From whence we may infer, that living in great and populous Cities, or in Camps, or near a Number of dead Carcaſes, may diſpoſe to *putrid, malignant Fevers.*

610. It is certain the Cauſes of *malignant* Fevers cannot always be aſcribed to the ſenſible Alterations of the Weather, or the manifeſt Qualities of *Heat, Cold, Moiſture,* or *Dryneſs,* highly predominant in the Air; but they ſometimes proceed from ſomething more nice and latent than all this.

611. IV. *Putrefied* or *corrupted Food* may occaſion this Diſeaſe, by mixing with the Blood ſome deleterious, morbid Particles, which will impreſs the ſame Qualities on the animal Fluids, that they are poſſeſſed of themſelves. For ſince the conſtitutive Parts of all animal, and ſome vegetable, Subſtances, are highly exalted and volatilized, and changed from a neutral State to one that is acrid and alkaline, whenever they are corrupted ſo as to ſtink; it evidently follows, that ſtale, ſtinking Meat, or ſtagnant, corrupted Water, may vitiate and corrupt the animal Juices, by aſſimilating them into their own Nature, and by rendering them alkaline, corroſive and poiſonous.

612. A *Corruption* or *Putrefaction* of the animal Fluids is no more than a Disjunction of their component Parts, whereby the proper Coheſion, or Cement between their Globules, or that Conſiſtence which beſt ſubſerves the Purpoſes of Life is deſtroyed; and whereby the Globules both of the red Blood and Lymph, divide into leſſer and leſſer, and continue ſubdividing till ſome of their Particles (chiefly the ſaline and oleaginous) become volatile, acrid, and pungent. And if the Diſſolution be carried further than this, as in dead, corrupting Bodies; theſe volatile, pungent Particles become more minute, and fly off the Body in great Quantities, and yield a ſtrong and fœtid Scent.

613. The White of an Egg (as we have obſerved above,) the moſt innocent Thing in the World, when digeſted and putrefied, is well known to operate like a Poiſon, cauſing Vomiting, Looſeneſs, *&c.* Whence I ſhould think that the *polite* Way of hanging up *Veniſon*, *Rabbits*, &c. till they turn green, or ſtink, muſt oftentimes be unwholeſome and prejudicial. Not long ſince I was called to a poor Man who had eaten heartily of *ſtale Mutton*, which he bought by Reaſon of it's Cheapneſs; I found him vomiting

ing and purging to a ſtrange Degree, and in all Reſpects he ſeemed as if he had been poiſoned: *Vinegar* diluted with Water, contributed moſt towards the Cure.

614. V. If any of the Excretions are obſtructed, and the obſtructed Matter is neither removed by *Nature*, nor a *feveriſh Heat*, there is immediate Danger of a *malignant Fever*; according to *Sanctorius*'s Aphor. 46. Sect. 1. For if the pent-up Matter be ſo much corrupted or degenerated from it's natural *Craſis*, that it cannot be excreted, or if the Veſſels have ſo far loſt their Vigour or Elaſticity as to be unable to excite a feveriſh Heat; the obſtructed Matter will, by being long detained in the Body, grow acrid, putrid, and corroſive, and will be diſpoſed to produce inteſtine, fermentative Motions in the animal Juices, whereby ſome Parts will coaleſce and form Corpuſcles too bulky to circulate freely, whilſt others will be reduced too low for a healthy State.

615. VI. *Preceding Illneſſes* ſometimes degenerate into *malignant Fevers*, *Bellini*, under the 27th *Propoſition*, in his *Mechanical Account of Fevers*, tells us, That *malignant* Fevers are ſometimes the Conſequences of thoſe that are not ſo; that a *ſimple intermit-*

ting Tertian eaſily changes into a double *intermittent*, and this into a *continuent*, and that into a *malignant* Fever. Since, therefore, ſays he, all theſe Changes are only from a leſſer to a greater Tenacity and Adheſion of *Lentor*, a malignant Fever muſt neceſſarily be from the ſame Origin as the reſt; and as thoſe go on from leſſer to greater, even to the utmoſt Aggravation of *Lentor*, the laſt muſt be the ſame as the firſt, and conſiſt in the higheſt Degree of *Lentor*.

616. But as to the latter Part of this Aſſertion, I cannot acquieſce to it, for the following Reaſons: 1ſt, That in the Height of a *continual Fever*, when the *Phænomena* are moſt dreadful, when the Heat has been very intenſe for a long Time, when the Humours ſeem to grow putrid, and the Fever is bordering upon a *malignant* State, the animal *Salts* and *Oils* are volatilized and exalted into an acrid, alkaline, corroding State; whence they contract a *diſſolvent* Quality; they colliquate and melt down the red Globules; the Quantity of Lymph increaſes, and all the Humours contract an alkaline Acrimony. 2dly, Though we allow that when *Intermittents* happen to be changed into *Continuents*, the *Lentor* is aggravated;

yet when Continuents degenerate into *malignant* Fevers, the moſt uſual *diagnoſtic* Signs plainly diſcover the Texture of the Blood to be weakened, and conſequently the Attraction between the conſtituent Globules of the *Lentor* to be leſs ſtrong.

617. If it was allowable to let Blood in *malignant* Fevers, the Thing would evidently appear; but as it is not, we muſt depend upon the Symptoms for our Guide. I ſhall only add, that I have ſome few Times ſeen ſome Blood which flowed from the Noſe of Perſons afflicted with this Diſeaſe, and which had not only more *Serum* than I ever found in *ardent* Fevers, but the *Craſſamentum* was more tender, and a deal of red Powder was ſunk to the Bottom of the Cup, which ſeemed as though the red Globules had been ground and torn to Pieces, by ſome diſſolvent Quality in the malignant Matter. However, as the Inſtances are but few, and the Quantities of Blood were but ſmall, I cannot pretend to lay much Streſs upon theſe *Phænomena*, only as they are analogous to the Arguments we have deduced from the Symptoms of this Diſeaſe.

618. VII. I would obſerve here, that there is ſome Reaſon to think that the *nervous*, as

well as the other *animal Fluids*, are ſometimes affected by the *Antecedents*, not only by diminiſhing the Secretion in the Brain, but by altering the Quality of the Matter ſecreted. For though the nervous *Tubuli* are exceedingly minute, and though very ſubtile Particles only can paſs through them; yet it is eaſy to apprehend that ſome of the malignant, febrile Particles may be ſmall enough to be ſecerned by the Glands of the Brain, and ſent through the Nerves; ſince any Particles, whoſe Bulk is leſs than the Diameter of the Orifices of the Secreting *Tubuli*, may enter into them, though they are of different Figures and Sorts. * And, indeed, if different Sorts of Particles did not ſometimes happen in the nervous Fluid, it doth not ſeem poſſible, that ſo great a Variety of nervous Diſorders ſhould afflict human Bodies, as have occurred to the Obſervation of Phyſicians. If the nervous Fluid was purely ſimple, and conſiſted but of one Sort of Particles, which admitted of no Variation, and only could differ from the healthful Standard by Exceſs or Deficiency in their Quantity, nervous Diſtempers might be fewer in Number, and more uniformly the ſame in their Appearances. But if the *Craſis* of the Blood may be ſo far diſſolved, and the animal *Salts* and *Oils* ſo comminuted, and divided, and the Mouths of the ſecreting *Tubuli* of the Brain ſo much widened and relaxed, as to admit of ſome foreign, heterogeneous Particles to paſs along with the nervous Fluid; then it will follow, that as they render it either more ſharp and acrid, or more viſcous and leſs fluxile, they will produce a large Train of direful Symptoms, proportionate to the Qualities and Quantities of the morbific Particles.

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* Vide *Lobb's Rational Methods of Curing Fevers.*

CHAP. XIV.

Of the Riſe *of the moſt uſual* Symptoms *incident to a* malignant FEVER.

619. MOST *Authors* agree that the general and true *characteriſtic Phænomena* of this Diſeaſe are as follow, *viz.*

I. *Cold Shiverings* at the Beginning, and a *quick, low, unequal Pulſe*; which ariſe from the ſame Cauſes with thoſe already taken Notice of §. 575.

620. II. *Great Heat*, in the inward Parts, ſoon ſucceeds the *Rigor*, not only from the Blood being accumulated in the larger Arteries and *Viſcera*, but alſo from the inteſtine, fermentative Motion, between the elaſtic, ſtrongly attracting, morbific Particles, and thoſe of the Blood.

621. III. The *Thirſt* is oftentimes exceedingly troubleſome, and much beyond the Meaſure of Heat; by Reaſon of the Paucity of *Saliva*, and the Acrimony of the Juices which are ſecreted by the Glandules of the *Fauces*, *Oeſophagus*, and *Stomach*, and which fret, and irritate the nervous Tunicles, ſo as to cauſe a perpetual Uneaſineſs. The Extremities of the capillary Veſſels which terminate on the Superficies of the Tongue, ſometimes mortify, by Reaſon the proper Supply of Blood and Lymph is prevented by ſome Obſtructions, and from a Tendency in the Fluids towards Putrefaction. But if the Patient recovers, theſe dry, black, mortified Fibres are ſloughed off from the ſounder Parts, in thick Skins, by the impulſe of a freſh and ſufficient Supply of Juices.

622. IV. *Colliquative, ſymptomatical Sweats* break forth in the *Beginning* and *Increaſe* of this Diſeaſe, which greatly debilitate the Nerves, and aggravate the Symptoms. They ariſe from the Diſſolution of the Blood and Lymph, and the Relaxation of the miliary Glands, and their excretory Ducts.

623. V. The Vigour of the Stomach being abated, and it's Glands relaxed, a Deal of viſcous, ſharp, ill-conditioned Matter is commonly caſt into it, at the Beginning of this Diſeaſe: Whence an *Inappetency, Nauſea, Vomiting, and Heart-burning.*

624. VI. *Violent Head-Ach, Pains in the Back, and Loins, Oppreſſion on the Breaſt, and frequent Sighings,* ariſe from Obſtructions in the *Arteriolæ,* and the Diſtenſion of the Veſſels from the inteſtine, fermentative Motion of the Fluids.

625. VII. *Pertinacious Watchings, Deliria, Coma,* &c. proceed from the ſame Cauſe in a greater Degree.

626. VIII. *A Languor, Fainting, Horror and Deſpair* are almoſt conſtant *Concomitants* of this Fever; by Reaſon the *Craſis* of the Blood is vitiated, and the Secretion of animal Spirits diminiſhed: And, perhaps, not only ſo, but the Decay of the *Vis Vitæ*

is ſometimes ſo extremely ſudden, that it ſeems as if the *malignant* Matter had entered the Nerves, and fixed and deſtroyed the Elaſticity or Virtue of the nervous Juice already ſecreted.

627. IX. *Petechial Spots,* or *red Efforeſcencies* in large *Areas* ſometimes appear upon the Skin, and never riſe above the Surface. * They ſeem to be conſtituted of broken Particles of red Blood oozing from the capillary ſanguine Arteries through the lymphatic Arteries, and cutaneous Glandules; which being not minute or ſubtle enough to perſpire through the Pores of the *Epidermis,* nor large enough to produce Tumours, do remain between the *Epidermis* and the *Cutis,* in the form of flat Spots. They do not ſeem to be critical Diſcharges from the Blood, becauſe the Sick does not grow a Whit the better upon their Appearance. The brighter red they are of, ſo much the better Sign; but when they appear of a purple, brown, duſky, or black Colour they manifeſt a greater Degree of Putrefaction.

628. X. When the venomous *Miaſma* have very much ruined the *Craſis* of the Blood, and broken down the red Globules

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* Vide *Lobb's Rational Methods of Curing Fevers.*

into their *Minima*, it is no uncommon Thing for them to run out of their own proper Channels, and produce *Tumours*, *Buboes*, *Carbuncles*, *Hæmorrhages*, &c.

629. XI. The *Urine* is ſometimes limpid and pale like that of Hypochondriac and Hyſteric Perſons; and at other Times it is intenſely red and high-coloured. When it is moſt crude and clear, the Symptoms are generally aggravated, by Reaſon the acrid, ſharp, corroſive, ſaline and ſulphureous Particles are left behind in the Blood, which are apt to inflame the *Meninges* of the Brain, and diſpoſe the Patient to be delirious, *&c.*

630. XII. Towards the *Height* of this Diſeaſe it is common for an *Apthæ*, or an Inflammation of the Membranes which line the Mouth, Gullet, Stomach, and inteſtinal Tube, to ariſe; and is generally eſteemed to be an Effort of Nature to throw off the morbific Matter through the excretory Ducts of the Glands which ſerve thoſe Parts.

631. XIII. In the *laſt State of malignant Fevers*, when the Secretion of animal Spirits is greatly diminiſhed, when the Humours are moſt putrid, when the animal *Salts* and *Oils* are rendered extremely acrid and corroſive, when the red Globules are melted

down, and the *Craſis* of the Blood is utterly ſpoiled, it is no uncommon Thing for the Sick to be deficient in his *Sight*, *Hearing*, *Smelling*, *Taſte*, through the Paucity of animal Spirits, and the languid, relaxed State of the Nerves; which are no longer able to receive and convey the *Ideas*, in a proper Manner, to the common *Senſorium* in the Brain.

632. XIV. For the ſame Reaſons a *Stupor*, *Syncope*, *tremulous Nerves*, *ſubſultory Tendons*, *Hiccoughs*, *involuntary Effuſions of the Fæces and Urine*, *Coldneſs of the Extremities*, *Loſs of their Motion*, *and Mortifications* may ariſe: For when the *Vis Vitæ* is at the loweſt Ebb, there is nothing bad that does not happen at that Time; and, of all the Miſeries that afflict human Life, there are none more deplorable than thoſe, which, at ſome Time or other, attend *malignant Fevers*.

CHAP. XV.

Of the Cure *of a* malignant FEVER.

633. THE *Cure* of this moſt dreadful Diſeaſe is plainly deducible from what has been ſaid in Regard to the *Antecedents*, and the *Phænomena* that attend it; *viz.* To ſupport the vital Power of the whole vaſcular Frame, to diſſolve the grumous Parts of the Fluids, to correct and alter the animal Salts and Oils from their acrid, alkaline Property, back again into a neutral State, and to reſtore to the whole Volume of Blood and Lymph their natural and healthy *Craſis*.

634. I. *Vomits* ſeem to be moſt proper in the *Beginning*, to diſcharge the acrid, corroſive Matter from the firſt Paſſages, and to attenuate the *Lentor*.

635. II. *Bliſtering Plaiſters* may be ſerviceable in bracing up and conſtringing the Fibres; though, perhaps, in Regard to the alkaline Acrimony of the Fluids, they may do Miſchief.

636. III. What has been ſaid in Relation to *Sweating*, *Purging*, and *Bleeding*, in the

Cure of ſlow Fevers, may be applied more earneſtly here, they being ſure to bring on fatal Conſequences.

637. IV. If the Pulſe are quick, if there be any preternatural Heat, with a ſcorched, dry Tongue, and Throat, *Diluents* and *Coolers* are moſt certainly indicated, notwithſtanding ſome of the Symptoms may ſeem to require more generous Liquors. If we conſider how long theſe Fevers ſometimes laſt, if we reflect on the Nature of the *Lentor,* and the Acrimony of the Humours, it may eaſily be apprehended how neceſſary *cooling, aceſcent, diluting Drinks* may be, and how prejudicial thoſe which are hot, acrid, and ſpirituous.

638. V. All *farinacious* Things therefore are proper, as having an aceſcent Quality. *Rheniſh-Wine* mixed with *Water, Barley-Water* with *Vinegar, Sack-Whey* with the Juice of *Lemons* or *Oranges,* and even the *ſtrongeſt Acids, viz. Ol. Vitriol. Ol. Sulphur. per Camp. Spt. Vitriol.* &c. dropped into ſome convenient Vehicles, produce good Effects, by ſtrongly attracting, and fermenting with the alkaline, animal Salts, and reducing them back again to a neutral State.

639. VI. All Medicines which ſtrengthen the Action of the Heart, Lungs, and Arteries, raiſe the Pulſe, and promote the Secretion of animal Spirits, without colliquating and diſſolving the Globules of Blood, and increaſing the alkaline Acrimony of the Juices, are of excellent Uſe. Such are, *Rad. Tormentil. Rad. Biſtort. Bol. Armen. Terra Japan. Coral. rub. ppt. Margarit. Ocul. Canc. Chel. Canc. Bezoar Orient. Lap. è Goâ*, &c.

640. But all *volatile Salts* and *Spirits*, ſuch as, *Sal Vol. Succini*, *Corn. Cervi*, *Armoniac. Viperarum*, &c. *Spt. Corn. Cervi*, *Sal Vol. Ol. Spt. Sal Armon.* &c. are deſtructive Medicines, becauſe they are known to break down and colliquate the Blood-Globules, and to render the animal Juices more acrid and alkaline; ſo that, conſequently, where the Blood tends to an alkaline Corruption, where the Bile is too acrid and pungent, and where the Solids and Fluids are diſſolved and melted down, ſuch Medicines as theſe ſhould be avoided as Poiſon.

641. VII. If *petechial* Spots appear, and the Symptoms continue moderate, it is ſufficient if what you give be able to keep out the Eruptions, and to preſerve them of a good Colour.

642. VIII. Towards the *ſtationary Period* of this Diſeaſe, when every Thing ſeems to take a fatal Turn, we frequently meet with *Apthæ* *, which may be conjectured coming on, from the great Dryneſs of all the Parts of the *Fauces*, but eſpecially thoſe more backward, attended with ſome Difficulty in paſſing of his Liquors: When this proves white, and ſeparates kindly, after few Days, the Patient has ſtill a good Chance for an Eſcape: But if black, ſhining, or glaſſy, ſpreading further over the Palate, too long durable; or if caſting off, returning again, there is little to be expected as to Recovery.

643. This Thruſh is not to be meddled with, but ſuffered, like Fruit duly ripened, to fall off itſelf; nor is any Thing to be adviſed, unleſs a little of the warm *pectoral Decoction* to be thrown in at theſe Times: For *Nature*, who has found out the Way of this particular *Criſis*, will, in her own Time, beſt fit it for throwing off, which Art may poſſibly interrupt, by too haſty a Suppuration, from the Uſe of maturating *Gargariſms*, or fix them faſter by *reſtringent* ones.

644. IX. If *Tumours*, *Carbuncles*, or *Buboes* ariſe, or if the *Criſis* happens to fall

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* Vide *Turner*'s *Diſcourſe concerning Fevers.*

upon any Part, where external Applications can be ſerviceable, it ought to be immediately incouraged, by *ſoftening*, *relaxing*, *emollient Cataplaſms*.

645. X. But if no *Criſis* can be procured, either by Art, or the Strength of Nature; if the Pulſe flag, the *Tremor*, and *Subſultus Tendinum* increaſe, the Tongue falters, the Urine and Fæces come away involuntarily, the Features ſink, the Patient keeps picking up the Bed-Clothes, and the extreme Parts are cold; we are to make a fatal *Prognoſtic*, and endeavour to ſupport him with the *higheſt Cordials*, as long as Life remains: For we do not want Inſtances of thoſe who have recovered, even after all theſe Symptoms have been upon them.

FINIS.

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